C 41.21: 41/6

March 25, 1966

U.S. GOVERNMENT

RESEARCH & DEVELOPMENT REPORTS

APR 11 1966

Semi-Monthly Journal

- *Abstracts of R & D Reports*
- *List of Current R & D Projects*
- *Indexes*

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March 25, 1966 / Volume 41, Number 6

U.S. Government

RESEARCH AND DEVELOPMENT REPORTS

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Entries are arranged under 22 subject categories called FIELDS. In the "Technical Abstract Bulletin" section, FIELDS are divided into sub-categories called GROUPS and occasionally subgroupings are also used. Documents are listed alpha-numerically (that is, alphabetic data precedes numerical data) by accession/report number. Although differing slightly in printing format, entries in the various sections contain essentially the same information.

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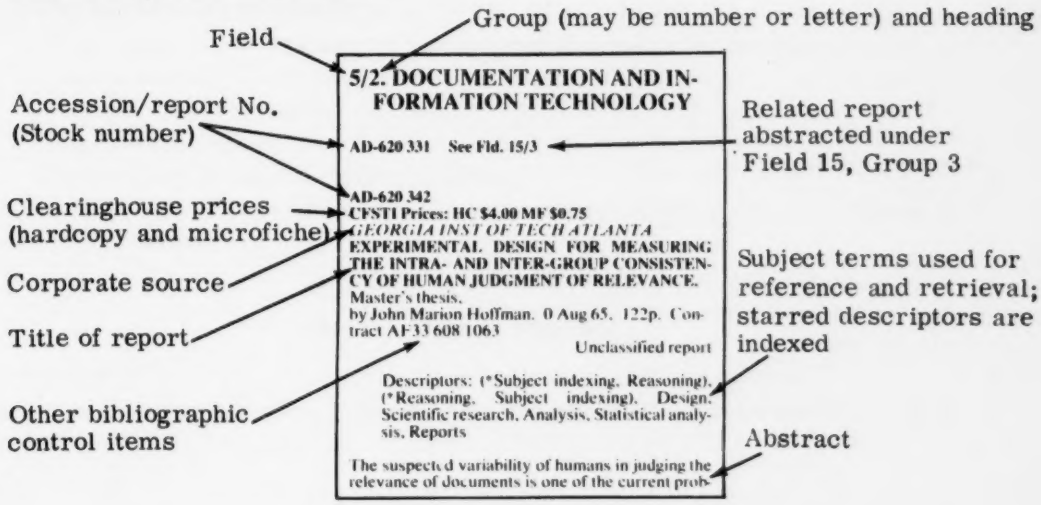
- OTHER RESEARCH REPORTS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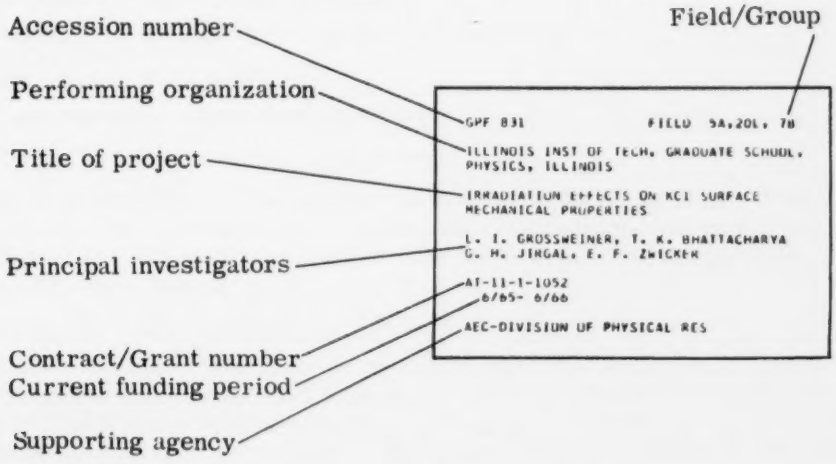

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Indexes – Subject, Personal Author, Corporate Author-Monitoring Agency, Contract Number, Report Number, AD-Field.

Section IV OTHER RESEARCH REPORTS AND RELATED MATERIAL S-1

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National Aeronautics and Space Administration reports.

Other civilian agency reports.

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Military reports previously classified or limited.

Indexes – Subject, Personal Author, Corporate Source, Contract Number, Accession/ Report Number.

SUBJECT CATEGORY HEADINGS

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02 AGRICULTURE 2, S-3

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03 ASTRONOMY AND ASTROPHYSICS 2, S-3

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04 ATMOSPHERIC SCIENCES 4, S-3

Includes atmospheric physics and meteorology.

05 BEHAVIORAL AND SOCIAL SCIENCES 6, S-4

Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology.

06 BIOLOGICAL AND MEDICAL SCIENCES 13, S-6

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11 MATERIALS 53, S-22
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14 METHODS AND EQUIPMENT 67, S-31
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17 NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES 71, S-34
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18 NUCLEAR SCIENCE AND TECHNOLOGY 75, S-35
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22 SPACE TECHNOLOGY 107, S–53

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RESEARCH highlights

Reports of current high industrial interest

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Plastics

NEW CLASS OF AROMATIC-HETEROCYCLIC POLYMERS DISCOVERED

(Order Stock No. N66-12530 An Exploratory Study of a New Class of Stepladder and Ladder Polymers — Polyimidazopyrrolones, HC $1.00/MF $0.50.)

A new class of aromatic-heterocyclic polymers with excellent thermal stability and a radiation stability exceeding that of any known synthetic polymer has been discovered by scientists at NASA's Langley Research Center. Called polyimidazopyrrolones or "Pyrrones" for short, this new class of stepladder and ladder polymers "holds considerable potential for aerospace as well as highly specialized terrestrial applications," according to the Langley developers. The chemical structure of the Pyrrones combines the structures of the aromatic polyimides and polybenzimidazoles. Since they are formed through an intermediate stage which is soluble, typical solution property measurements can be used for basic molecular characterization. Knowledge of the molecular properties of the soluble intermediate reflect on the molecular character of the final insoluble Pyrrones. The Pyrrones can be easily prepared by the room-temperature reaction of aromatic tetraamines with aromatic dianhydrides in polar solvents such as dimethyl formamide. The soluble intermediate (amino-acid-amide polymer) is supported by infrared absorption spectra and correlation to the chemistry of related dye compounds. According to Langley, the soluble polymeric intermediate greatly enhances the potential utility of these materials through conventional fabrication techniques. Dr. Vernon L. Bell, co-author of the Langley Research and Development program report, says additional studies for applications include aging and thermal cycling, and a report on further developments is in progress.

LINEAR POLYMER OF DIMETHYLSILAZANE PREPARED FROM CYCLIC SILAZANES

(Order Stock No. AD-627 640 Silazane Polymers, HC $3.00/MF $0.50.)

A linear polymer of dimethylsilazane from the cyclic silazanes has been prepared at Harvard University's Mallinckrodt Laboratory. Elemental analysis, NMR spectra, and infrared absorption spectra all prove that this product is indeed linear polymer composed of a multiplicity of $(CH_3)_2Si$-NH units. Harvard's development report, prepared for the sponsoring Advanced Research Projects Agency of the Department of Defense, notes that although methods for making linear polymers of dimethylsiloxane (silicone rubber) from the corresponding cyclic siloxanes have been known for 20 years, no method for preparing a corresponding linear polymer of dimethylsilazane from the cyclic silazanes had heretofore been found. The Harvard work began with a study of the kinetics and mechanisms of the Kruger process -- the only one available for obtaining solid polymeric dimethylsilazane of any kind -- in which the product of this method was crosslinked through tertiary nitrogen atoms through an unavoidable side reaction. This study of the Kruger condensation revealed that the evolution of ammonia which brings about the crosslinking could be suppressed by conducting the reaction under a pressure of ammonia. In fact, polymerization of cyclic dimethylsilazane could be accomplished by heating the silazane under ammonia pressure alone, without any Kruger catalyst. An equilibrium mixture resulted from which a low yield of linear polymer was isolated. The Harvard report describes the process and notes that methods for improving the yield and for increasing the molecular weight now are being sought.

Nuclear Technology

BROOKHAVEN'S BARN BOOK UPDATED

(Order Stock No. BNL-325, Second Edition, Suppl. 2, Neutron Cross Sections Volume I, Z=1 to 20, HC $2.50/MF $1.25, and BNL-325, Second Edition, Suppl. 2, Neutron Cross Sections Volume III, Z=88 to 98, HC $3.00/MF $1.50.)

A great number of new measurements, appearing in two supplements to Brookhaven National Laboratory's famous "Barn Book," update information contained in the BNL-325 Second Edition of 1958 and in Supplement No. 1 of 1960. The new publications covering elements 1 to 20 and 88 to 98 give thermal cross section, resonance parameters, and cross section curves. Since, according to Brookhaven, they supersede the previous issues only when there is new information or new interpretations of old information, the user will be well advised to keep the two previous issues at hand.

AEC BOOK TREATS REMOTE HANDLING OF MOBILE NUCLEAR SYSTEMS

(Order Stock No. TID-21719 Remote Handling of Mobile Nuclear Systems, HC $4.50/MF $2.75.)

Tools and methods for the remote handling of mobile nuclear systems and problems encountered by the engineer are described in a book recently published by the Atomic Energy Commission. The book treats the electrical and mechanical aspects of remote handling, but it covers the less familiar nuclear considerations in greater depth. It describes nuclear systems and the Idaho Test Station, remote-handling procedures and support equipment, general-purpose facilities and tools, mechanical parts, shielding calculations, radiation effect, and health physics.

GROWING NUCLEAR POWER INDUSTRY WILL SATISFY RADIOISOTOPE DEMAND

(Order Stock No. DP-1015 Radioisotope Production Capabilities of U.S. Power Reactors, HC $2.00/MF $0.50.)

The nuclear power industry will grow at an optimistic rate for the next 15 years and it will be called upon to supply the increasing demand for radioisotopes of interest as heat sources. According to a study made by the Savannah River Laboratory for the Atomic Energy Commission, this assumption of growth is based on the recent increase in orders for large nuclear power plants. This increasing demand will result in a rate of growth differing from any predicted rate, and deviations from the predicted growth will affect the rate of production of radioisotopes requiring long lead times, such as plutonium 238. Savannah River Lab. has therefore made an evaluation of the potential of the nuclear power industry to produce promethium 147, polonium 210, plutonium 238, and curium 244 by 1980. Estimated total possible production by power reactors in the decade 1971-1980 range from 100 kwt (thermal kilowatts) of ^{244}Cm to 240 kwt of ^{210}Po. The estimated possible annual rates in 1980 range from 30 to 50 kwt. Savannah indicates that substantial increases in the production of ^{238}Pu and ^{244}Cm can be achieved by irradiating ^{237}Np and ^{243}Am from power reactors in special reactors that operate at a neutron flux of 10^{14} n/(cm^2) (sec) or higher. Recycling of plutonium in power reactors will also increase production of ^{244}Cm.

AEC PUBLISHES PAPERS ON SODIUM COMPONENTS DEVELOPMENT

(Order Stock No. CONF-650620 Proceedings of Sodium Components Development Program, HC $3.00/MF $1.50.)

The 18 papers presented at the 1965 Proceedings of the Sodium Components Development Program (SCDP) have been published by the Atomic Energy Commission. The SCDP is a Commission-wide effort to develop within the industrial complex of the U.S. competence for manufacturing safe, reliable, and economical components for advanced sodium-cooled nuclear power plants and the supporting technology to achieve this objective. Sponsored by the Commission's Chicago Operations Office, the 1965 meeting was held to coordinate and foster the exchange of information in the area of components for sodium-cooled reactors. Papers were presented by U.S. National Laboratories and industry, the United Kingdom, Euratom and Interatom.

Sanitary Engineering

NUCLEAR POWER-DESALINATION PLANT SAID ECONOMICAL

(Order Stock No. TID-22330 (Vol. 1) Engineering and Economic Feasibility Study, Phases I and II, for a Combination Nuclear Power and Desalting Plant, HC $4.00/MF $2.50.)

A nuclear power plant, cooled with a commercial light water and moderated by a nuclear steam supply system of 617 Mwe net, can produce both power and desalinated water at lower cost than a comparable gas-oil powered plant, according to Bechtel Corporation. In a survey of several Southern California sites, Bechtel estimates costs of power and water from the nuclear power and desalting plant at 3.05 mills per kilowatt-hour and 26.5 cents per 1,000 gallons. The costs of a fossil-fired plant are 4.05 mills and 33 cents. Bechtel's feasibility study gives details on the conceptual designs of sea water systems, site selection, safety consideration, fossil versus nuclear fueled dual-purpose plants, capital cost estimates, and water costs.

Biological and Medical Sciences

NASA'S AEROSPACE MEDICINE AND BIOLOGY SERIES AVAILABLE AS PACKAGE

(Order Stock No. NASA-SP-7011-00 through SP-7011-17 Aerospace Medicine and Biology, HC $14.00.)

The complete series of 1964 and 1965 Aerospace Medicine and Biology (18 issues), a continuing bibliography released by the National Aeronautics and Space Administration, is now available as a package. Individual issues may also be purchased and prices are available upon request. The 1966 bibliographies are available monthly on a subscription basis from the January issue at $10 per year.

Serving as a current abstracting and announcement medium for references, the bibliography assembles within the covers of a single publication references that were formerly announced in separate journals, thus providing a convenient compilation for medical and biological scientists. It concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. It covers related topics such as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors.

The bibliography places emphasis on applied research but references to fundamental studies and theoretical principles related to experimental development are also included. It is compiled as a joint effort of the National Aeronautics and Space Administration, the Library of Congress, and the American Institute of Aeronautics and Astronautics.

PROCEEDINGS OF AEC CONFERENCE ON FALLOUT

(Order Stock No. CONF-765 Radioactive Fallout From Nuclear Weapons Tests, HC $6.50/MF $4.00.)

The Proceedings of the Second Conference on Radioactive Fallout from Nuclear Weapons Tests, sponsored by the Atomic Energy Commission at its Germantown, Md., headquarters, November 1964, have been published. Contained in the single volume are the 57 papers presented. Since the first conference was held in 1961, much progress in understanding fallout mechanisms has been made by investigators throughout the world, says the AEC. In addition, recent studies have provided information on certain fallout problems which permits better fallout predictions and assessments than were possible several years ago. The report of the Second Germantown Conference Proceedings highlights the recent major research findings of the AEC's Division of Biology and Medicine.

Mechanical Equipment

ADVANCED BEARING TECHNOLOGY HANDBOOK BACK IN PRINT

(Order Stock No. N64-15226 Advanced Bearing Technology, HC $1.75/MF $2.25.)

NASA's advanced bearing technology book is again available. According to the Space Agency, it is an authoritative and reasonably complete discussion of both the fundamental principles of friction, lubrication, and wear, and the application of these principles to bearing technology. Despite its origin in the aerospace field, the body of information has wide applicability and the demand for the book prompted NASA to go into a second printing. The book is devoted primarily to advanced bearing problems but the principles established and enunciated therein apply equally well to ordinary bearing problems.

NASA STUDY EXTENDS BEARING LIFE FIVEFOLD

(Order Stock Nos. N66-12527 Bearing Life and Failure Distribution as Affected by Actual Component Differential Hardness, HC $1.00/MF $0.50; and N65-18209 and N65-18208 Effect of Component Differential Hardnesses on Residual Stress and Rolling-Contact Fatigue, each HC $1.00/MF $0.50.)

Bearing life can be extended four to five times over that which is achieved using current bearing manufacturing practices, according to three Research and Development reports prepared by the Space Agency. Upon the recent completion of an extensive research program, NASA says that current manufacturing practice generally specifies that bearings shall have balls or rollers of hardness equal to the hardness of the races. After prolonged bearing fatigue life testing using balls and races of varying hardness combinations, NASA engineers discovered that maximum fatigue life occurs when the hardness of the bearing balls or rollers is greater than that of the bearing races by an amount between one and two points as measured on the Rockwell C scale. "When this difference in hardness is controlled within these limits," says the NASA report, "bearing life can be extended to four or five times that which is currently achieved in bearings with balls or rollers of the same hardness as the races." The NASA tests used groups of SAE 52100 steel inner bearing races tempered to nominal Rockwell C hardnesses of 60, 63, and 65 and stresses to run against groups of bearing balls of the same material and of varying hardness. For a specific inner race hardness, the test results indicated rolling-contact life and load-carrying capacity of the system reached a maximum as a function of the differential hardness, that is, ball hardness minus race hardness. The peak life-hardness combination occurred when this difference was between one and two points on the Rockwell C scale. Although NASA owns this invention and has filed a patent application, the agency encourages its immediate commercial use. To obtain rights, address inquiries to NASA, Code AGP, Washington, D.C. 20546. NASA's complete research program, performed by the Lewis Research Center, Cleveland, is covered in the three reports.

Machine Tools and Tooling

MAGNETIC TORQUE WRENCH DEVELOPED

(Order Stock No. SC-TM-65-48 An Adjustable Positive-Limit Magnetic Torque Wrench, HC $1.00/MF $0.50.)

An adjustable positive-limit magnetic torque wrench that can satisfy the requirements of a reliable gas seal has been developed by Sandia Laboratory. Sandia undertook the development because existing torque wrenches were unable to produce values of torque of the required accuracy and repeatability to ensure reliable gas seal O-rings. Since the prototype apparatus is a permanent magnet type, operating in the 250 to 450 inch-pound range, it has the advantage of requiring no auxiliary power or equipment. The average nonrepeatability at any given lower current setting is about plus or minus 2-1/2 percent of full scale reading. At higher current settings (about 125 mamp), the nonrepeatability is less than plus or minus 2 percent of full scale. The wrench can produce very accurate torque values above 750 inch-pounds. Because of the inherent repeatability of electromagnetic attraction, Sandia felt that the force between an electromagnet and a soft iron bar can be used at the end of a torque wrench lever arm to create a predetermined maximum torque which cannot be exceeded, since the contact faces would separate when the maximum is reached.

Space Technology

NASA COMPILES DICTIONARY OF TECHNICAL AEROSPACE TERMS

(Order N66-10413 Dictionary of Technical Terms for Aerospace Use, HC $3.00/MF $1.50.)

A dictionary of technical terms for aerospace use has been prepared by NASA to ease the problem of communication among the various disciplines by providing authoritative definitions of terms commonly used in the literature of space exploration. It is designed for use by a person with a scientific or engineering education who is writing or reading in a field outside his own specialty. The definitions are intended to be accurate with respect to their technical content and reflect the usage of experts in the various fields. Whenever possible, NASA has chosen operational type definitions which define concepts in terms of actual operations by which the defined quantity can be measured, rather than in terms of properties.

NASA'S UNIVERSITY PROGRAM REVIEWED

(Order Stock No. SP-85 NASA University Program Review Conference, HC $1.50/MF $2.00.)

The Proceedings of the 1965 NASA University Program Review Conference contains papers on training, research, space flight experiments, technology utilization, and research facilities. About 600 representatives from colleges and universities attended, and speakers outlined and discussed the nature of the work being undertaken under NASA sponsorship, the manner in which it is being conducted, the results being obtained, and the impact being made. NASA's Sustaining University Program is a coordinated effort in support of training, research, and research facilities. These efforts complement NASA's project research program and provide comprehensive university efforts to meet NASA's scientific and technological needs. This not only contributes directly to the space mission but simultaneously strengthens the national educational complex.

Lubricants

BARRIER LUBRICATING FILM TECHNIQUE CONFINES SILICONE WITHIN BEARINGS

(Order Stock No. AD-627 345 A New Approach to Lubricating Ball Bearings, HC $1.00/MF $0.50.)

A barrier lubricating film technique developed by the Naval Research Laboratory corrects a flaw in silicone lubricating oils and brings about a tenfold increase in life expectancy of such things as synchros and servo motors. The Navy also says the new system can be valuable for other types of equipment. The barrier film has the ability to confine sufficient silicone fluid within the bearings to minimize the incidence of boundary lubrication. An examination of failed bearings, most of which had been lubricated with silicone oils, revealed much evidence of fretting corrosion, badly worn and broken ball retainers, dry residues, and lack of visible lubricant. The silicones, used because of their excellent low-temperature viscometric properties, low volatility, and high-temperature stability, tend to creep away from critical bearing areas during service and also while the synchros are in storage. Since the bearings cannot be relubricated in the field, boundary lubrication conditions soon prevail, the silicones are unable to lubricate adequately, and a short bearing life results.

CURRENT research & development PROJECTS

01. Aeronautics

NIL 9 FIELD 20D,10B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS

SLIP AND ACCOMMODATION COEFFICIENT IN A RAREFIED GAS

S. L. SOO, D. G. DAKBEE, H. L. SMOOT
/65- /

ILLINOIS, UNIVERSITY OF

NIL 46 FIELD 12A, 8E,13M,20D

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, ILLINOIS

HYPERSONIC VISCOUS FLOWS

S. M. YEN, B. SINDERMAN, R. TATE
/65- /

ILLINOIS, UNIVERSITY OF

NIL 48 FIELD 20D,10B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, ILLINOIS

THE ANALYSIS OF NONSTEADY NOZZLE FLOWS WITH HEAT ADDITION

R. A. STREHLOW, W. L. WEAVER
/65- /

ILLINOIS, UNIVERSITY OF

NIL 53 FIELD 20D,10B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, ILLINOIS

GROUND EFFECT MACHINE - BLOWING CYLINDER

R. W. MCCLOY, H. W. CHEN
/65- /

ILLINOIS, UNIVERSITY OF

02. Agriculture

ZYA 33072 3 FIELD 13G,13B, 8H

USDA, AGR RES SERVICE, FORT COLLINS, COLORADO

DRAINAGE FACILITIES, METHODS, AND DESIGN CRITERIA FOR PROTECTION AND IMPROVEMENT OF AGRICULTURAL CROPS AND SOILS IN THE NORTHERN PLA
H. R. HAISE
AG-SWC-06-05
/66- /

AGRICULTURE-DEPT OF AGRICULTURE

03. Astronomy and Astrophysics

GSP 2074 1 FIELD 3A, 3B

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, LICK OBSERVATORY, CALIFORNIA
STELLAR MAGNETIC FIELDS
G. W. PRESTON

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NSF-PHYSICAL SCIENCES DIVISION

04. Atmospheric Sciences

7GX 240 3

UNIV OF CAL-DAVIS, SCHOOL OF AGRICULTURE, AGRIC ENGINEERING, CALIFORNIA

MESO WIND PATTERNS IN THE CENTRAL CALIFORNIA VALLEY

W. E. YATES, H. B. SCHULTZ
7-AP-00292-03
8/65- 7/66

PHS-BSS

7GX 1354 2 FIELD 13A, 4B

ATMOSPHERIC RES GROUP, ALTADENA, CALIFORNIA

ATMOSPHERIC DIFFUSION IN THE INERTIAL SUBRANGE

P. B. MACCREADY, S. BERMAN, C. CHIEN
T. B. SMITH
7-AP-00354-02
10/65- 9/66

PHS-BSS

GSP 1302 2 FIELD 4A,12A, 8E,20I

RICE UNIVERSITY, GRADUATE SCHOOL, SPACE SCIENCE, TEXAS

THE NATURAL HYDROMAGNETIC WAVE SPECTRUM

A. J. DESSLER
NSF-GP-2228
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

NUS 48 FIELD 8H

UTAH ST UNIV OF AGRIC, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, UTAH

FORECASTING IN THE STATE OF UTAH

D. G. CHADWICK, D. L. GRIFFIN
7/65- 6/66

UTAH STATE UNIVERSITY

NUT 1 FIELD 4A, 8+, 9+

UTAH ST UNIV OF AGRIC, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, UTAH

ATMOSPHERIC PROBE RADIOMETERS

D. J. BAKER, R. BRISCOE, F. BROWN
V. KING, L. TAYLOR, C. WYATT
7/65- 6/66

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GSP 1858 1 FIELD 7C,12A,20J

COLUMBIA UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY

B. P. DAILEY

NSF-GP-3559
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1859 1 FIELD 7D, 7A, 7B

BOSTON UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

MECHANISMS OF ELECTRON TRANSFER REACTIONS

J. F. ENDICOTT

NSF-GP-3467
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1863 1 FIELD 7C, 7D,20M

UNIV OF SOUTH CAROLINA, GRADUATE SCHOOL, CHEMISTRY, SOUTH CAROLINA

SOLUTIONS OF ELECTROLYTES IN SOLVENTS OF HIGH DIELECTRIC CONSTANT

D. D. BONNER

NSF-GP-3475
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1864 1 FIELD 7D, 7A, 7B

WELLESLEY COLLEGE, UNDERGRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

EXPLORATORY STUDIES IN THE VOLTAMMETRY OF BRONSTED ACIDS AND BASES

T. R. BLACKBURN

NSF-GP-3510
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1867 1 FIELD 7C

UNIV OF CAL-DAVIS, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

SYNTHESIS AND PROPERTIES OF GEM-DIFUNCTIONAL ORGANOMETALLIC COMPOUNDS

G. ZWEIFEL

NSF-GP-3521
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1872 1 FIELD 7C, 7D,20J

DARTMOUTH COLLEGE, GRADUATE SCHOOL, CHEMISTRY, NEW HAMPSHIRE

PHYSICAL CHEMISTRY OF HIGH POLYMERS

W. H. STOCKMAYER

NSF-GP-3522
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1875 1 FIELD 7C, 7D,20J

UNIV OF NOTRE DAME, GRADUATE SCHOOL, CHEMISTRY, INDIANA

DIBORAORGANIC COMPOUNDS

D. J. PASTO

NSF-GP-3557
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1876 1 FIELD 7C, 7D,21B, 7B

PENNSYLVANIA ST UNIV, SCHOOL OF MINERAL IND, FUEL TECHNOLOGY, PENNSYLVANIA

RADICALS GENERATED BY THE SODIUM FLAME

H. B. PALMER, P. S. SKELL

NSF-GP-3507
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1878 1 FIELD 7A, 7D,20L, 7B

SYRACUSE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

FLUCTUATION PHENOMENA AND PHASE TRANSITIONS IN CONDENSED SYSTEMS

H. BRUMBERGER

NSF-GP-3588
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1882 1 FIELD 7C, 7D

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

CHEMISTRY OF THE CUBANE SYSTEM

P. E. EATON

NSF-GP-3543
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1886 1 FIELD 7C, 7D,20M

UNIVERSITY OF SO FLA, UNDERGRADUATE SCHOOL, CHEMISTRY, FLORIDA

CHELATION AND ION EXCHANGE REACTIONS IN MIXED SOLVENTS

E. D. OLSEN

NSF-GP-3482
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1888 1 FIELD 7C,20J

PENNSYLVANIA ST UNIV, GRADUATE SCHOOL, CHEMISTRY, PENNSYLVANIA

CORRELATION OF REACTIVITIES AND SOLVENT INTERACTIONS BY F-NMR

R. W. TAFT

NSF-GP-3608
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1900 1 FIELD 7C, 7A, 7D, 7B

CORNELL UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

CONCERTED REACTION MECHANISMS

M. J. GOLDSTEIN
NSF-GP-3527
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1902 1 FIELD 7C, 7D,20J

UNIVERSITY OF UTAH, GRADUATE SCHOOL, CHEMISTRY, UTAH

2,3-DIAZABICYCLO - 2.2.1. - HEPTANES AND BICYCLO - 2.1.0 - PENTANES

E. L. ALLRED

NSF-GP-3534
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1919 1 FIELD 20J, 5A

FAIRLEIGH DICKINSON, GRADUATE SCHOOL, NEW JERSEY

TORSIONAL VIBRATIONS OF LARGE MOLECULES IN THE FAR INFRARED

K. D. MOLLER, P. W. PARKER
NSF-GP-3597
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1921 1 FIELD 20J,20C, 5A,20L

TEMPLE UNIVERSITY, GRADUATE SCHOOL, PHYSICS, PENNSYLVANIA

PARAMAGNETIC RESONANCE AND OPTICAL SPECTRA OF TRANSITION ELEMENT IONS

E. L. OFFENBACHER

NSF-GP-3656
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1958 1 FIELD 7C, 7D, 8D, 7B

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, GEOLOGY, TEXAS

METAL COMPLEXES AT ELEVATED PRESSURES AND TEMPERATURES

E. INGERSON

NSF-GP-3722
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GUE 14 2 FIELD 7D, 7A, 8H

AEROJET GENERAL CORP, AZUSA, CALIFORNIA

STUDY OF MEMBRANES FOR DESALINATION BY REVERSE OSMOSIS

B. KEILIN, R. E. KESTING
C. W. SALTONSTALL, A. L. VINCENT

SW-14-01-0001-338
7/65- 6/66

INTERIOR-OFFICE OF SALINE WATER

GUE 20 3 FIELD 7C, 7D, 8H

GENERAL DYNAMICS CORP, SAN DIEGO, CALIFORNIA

REVERSE OSMOSIS FOR WATER DESALINATION

U. MERTEN, H. K. LONSDALE, R. L. RILEY
K. D. VOS

SW-14-01-0001-250
5/65- 4/66

INTERIOR-OFFICE OF SALINE WATER

GUE 106 1 FIELD 7C, 7D,11G,20J

AEROJET GENERAL CORP, AZUSA, CALIFORNIA

RESEARCH AND DEVELOPMENT OF NEW POLYMER SYSTEMS FOR REVERSE OSMOSIS MEMBRANES

C. W. SALTONSTALL, W. S. HIGLEY
B. KEILIN
/66- /

INTERIOR-OFFICE OF SALINE WATER

GYE 820006 1 FIELD 7C, 7D

PLASTICS RES INST TNO, NETHERLANDS

PREPARATION OF METAL ALKOXIDES OF STARCH FOR USE AS INTERMEDIATES IN SYNTHESIS OF

J. HUETGEERT
AGF-E19-UR-0018
9/65- 8/66

AGRICULTURE-DEPT OF AGRICULTURE

GYE 890114 1 FIELD 7C, 7D,20M,11A

CSIR HYDERABAD, INDIA

PREPARATION OF POLYMERIZABLE MONOMERS FROM CASTOR OIL HYDROXYUNSATURATED FATTY ACIDS

J. S. AGGARWAL
AGF-A07-UR-0069
9/65- 8/66

AGRICULTURE-DEPT OF AGRICULTURE

NCA 27 FIELD 7D,11F,12A, 5C

UNIV OF CAL-LA JOLLA, GRADUATE SCHOOL, OCEANOGRAPHY, CALIFORNIA

MULTIPLE EFFECT FLASH EVAPORATOR

L. A. BROMLEY, L. *. BROMLEY, N. W. COOK
A. E. DIAMOND, S. M. READ
/66- /

CALIFORNIA, UNIVERSITY OF-ALL BRANCHES

PW 853 FIELD 7C,20J

CITY UNIV N Y NEW YORK, NEW YORK

CONFORMATIONAL ASPECTS OF BIRADICAL INTERMEDIATES

I. AXENROD
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 912 FIELD 7C, 7D, 7B

MARYGROVE COLLEGE, UNDERGRADUATE SCHOOL, MICHIGAN

THE PREPARATION AND COORDINATION CHEMISTRY OF A VARIETY OF COMPOUNDS CONTAINING ADJACENT NITROGEN AND PHOSPHORUS ATOMS

M. A. FLEMING
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 914 FIELD 7D, 7B

BROWN UNIVERSITY, RHODE ISLAND

SYNTHESIS AND STABILITY OF GRUNERITE

W. C. FORBES
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

VZ 187 1 FIELD 7C

QUEENS UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, CANADA
ATTEMPTED SYNTHESIS OF NUCLEOSIDES CONTAINING A SUGAR WITH NITROGEN IN THE RING IN PLACE OF O-RIBOFURANOSE
J. K. JONES
7/65- 6/66
CANADIAN NATIONAL CANCER INST

YIL 228 FIELD 7D, 7A, 8D, 8G

STATE, GEOL SURV URBNA, ILLINOIS

STUDIES OF SPECIFIC SURFACE AREAS, CARBONATE DECOMPOSITION, AND OXIDE SINTERING BY CONTINUOUS-FLOW METHODS

J. THOMAS, G. M. HIEFTJE
/65- /

STATE-ILLINOIS

YIL 278 1 FIELD 7C, 7D,21D, 7A

STATE, GEOL SURV URBNA, ILLINOIS

GAS CHROMATOGRAPHY

W. J. ARMON
/65- /

STATE-ILLINOIS

ZXA 650227 FIELD 7D,20M

U S PUBLIC HEALTH SERV, MARYLAND

THE HEAT OF THE REACTION FORMING THE THREE-STRANDED POLY COMPLEX

P. D. ROSS, R. L. SCRUGGS

NIH-NIAMD-LMB-19
/65- /

PHS-NIH-NATL INST ARTHRITIS + METAB DIS

08. Earth Sciences and Oceanography

7GX 1240 2 FIELD 7D, 8H

UNIV OF WISCONSIN, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, WISCONSIN

CONCENTRATION OF ORGANIC SOLUTES IN NATURAL WATERS

G. F. LEE, E. GJESSING, J. O. PETERSON

7-WP-00371-02
9/65- 8/66

PHS-BSS

7GX 3449 1 FIELD 8C,12A, 8E

UNIVERSITY OF FLORIDA, SCHOOL OF ENGINEERING, COSTAL ENGINEERING, FLORIDA

TRANSVERSAL DRIFTS IN BOTTOM PROFILE

C. J. SONU, P. M. BRUUN, P. G. TELEKI

7-WP-00889-01
9/65- 8/66

PHS-BSS

GSP 341 4 FIELD 8D, 8G

UNIV OF WISCONSIN, GRADUATE SCHOOL, GEOLOGY, WISCONSIN

BIOSTRATIGRAPHY OF SELECTED PALEOZOIC AND CENOZOIC ROCKS

D. L. CLARK

NSF-GP-3545
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 357 4 FIELD 8D, 8G, 7B

CAL INST OF TECHNOLOGY, GRADUATE SCHOOL, GEOLOGICAL SCIENCES, CALIFORNIA

CHEMICAL EQUILIBRIUM IN COEXISTING PHASES OF QUARTZ-MUSCOVITE ROCK

A. L. ALBEE

NSF-GP-3570
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1143 3 FIELD 8D, 8G, 8C

MICHIGAN STATE UNIV, GRADUATE SCHOOL, GEOLOGY, MICHIGAN

SIGNIFICANCE OF SPORES AND OTHER DETRITUS IN RECENT SEDIMENTS

A. T. CROSS, A. *. CROSS
NSF-GP-3550
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1183 2 FIELD 8D, 8G

SYRACUSE UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, NEW YORK

OROGENIC AND PETROLOGIC EVOLUTION OF PRECAMBRIAN STRUCTURES IN SOUTH CENTRAL ADIRONDACK HIGHLANDS

D. DEWEARD
NSF-GP-2055
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1500 2 FIELD 8D, 8G, 8C

OREGON STATE UNIV, GRADUATE SCHOOL, OCEANOGRAPHY, OREGON

PHYSICAL-CHEMICAL PROPERTIES OF SEA WATER

P. K. WEYL

NSF-GP-3582
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1796.1 FIELD 8C

HARVARD UNIVERSITY, SCHOOL OF ENGINEERING, PHYSICS, MASSACHUSETTS

RESEARCH IN OCEANIC DYNAMICS

A. R. ROBINSON, A. *. ROBINSON

NSF-GP-3533
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1798 1 FIELD 8K, 8H

UNIV OF MINNESOTA, GRADUATE SCHOOL, GEOLOGY + GEOPHYSICS, MINNESOTA

MECHANICAL RADIATION FROM FRACTURE

J. C. SAVAGE
NSF-GP-3565
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1869 1 FIELD 8D, 8F

YALE UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, CONNECTICUT

PALEONTOLOGY AND STRATIGRAPHY OF THE OLIGOCENE AND MIOCENE DEPOSITS OF EGYPT

E. L. SIMONS

NSF-GP-3547
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1892 1 FIELD 8D, 8F, 8G, 8C

UNIVERSITY OF HAWAII, GRADUATE SCHOOL, GEOPHYSICS, HAWAII

DEEP EXPLORATORY BORING IN THE PEARL HARBOR AREA, HAWAII

G. P. WOOLLARD, T. K. CHAMBERLAIN
H. T. STEARNS

NSF-GP-3545
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1906 1 FIELD 8D, 8G

STATE UNIV N Y ALBANY, UNDERGRADUATE SCHOOL, EARTH SCIENCES, NEW YORK

WILDFLYSCH-LIKE CONGLOMERATE OF THE TACONIC REGION

J. M. BIRD

NSF-GP-3563
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1942 1 FIELD 8G, 8C

UNIV OF WASHINGTON, GRADUATE SCHOOL, OCEANOGRAPHY, WASHINGTON

MINERAL COMPOSITION OF COLUMBIA RIVER SEDIMENTS

J. T. WHETTEN
NSF-GP-3591
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1944 1 FIELD 8K, 8G

ST. LOUIS UNIVERSITY, SCHOOL OF ENGINEERING, GEOPHYS + GEOPHYS ENGR, MISSOURI

EARTH STRAIN INVESTIGATIONS

W. STAUDER
NSF-GP-3587
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1948 1 FIELD 8D, 8G

CORNELL UNIVERSITY, GRADUATE SCHOOL, GEOLOGY + GEOGRAPHY, NEW YORK

PLANT SPORES IN THE DEVONIAN OF NEW YORK

J. B. RICHARDSON, K. C. ALLEN
H. P. BANKS, J. *. RICHARDSON
NSF-GP-3606
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1957 1 FIELD 8D, 8G, 8C

RICE UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, TEXAS

SEDIMENTOLOGY AND FORAMINIFERAL ECOLOGY, INNER CONTINENTAL SHELF OF SOUTH LOUISIANA

R. R. LANKFORD

NSF-GP-3600
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1966 1 FIELD 8D, 8G, 7B

WESTERN RESERVE UNIV, GRADUATE SCHOOL, GEOLOGY, OHIO

GEOCHEMICAL AND MINERALOGIC VARIATIONS IN A SMALL INTRUSIVE ASSEMBLAGE

J. A. CAIN, P. O. BANKS

NSF-GP-3670
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1969 1 FIELD 8C

USN, OFF NAV RES, NAV RES LAB, DIST OF COLUMBIA

SUPPORT OF THE COMMITTEE ON OCEANOGRAPHY OF THE NATIONAL ACADEMY OF SCIENCES

W. E. BERG
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1971 1 FIELD 8N, 8G, 8C

UNIVERSITY OF HAWAII, GRADUATE SCHOOL, GEOPHYSICS, HAWAII

GRAVITY, MAGNETICS AND BATHYMETRY OF THE SEAS ABOUT THE SOLOMON AND BISMARCK ISLANDS

G. P. WOOLLARD

NSF-GP-3571
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1984 1 FIELD 8G, 8C

UNIVERSITY OF MIAMI, DIVISION OF RESEARCH, MARINE LAB, FLORIDA

SUPPORT OF THE PLANNING OF THE JOINT OCEANUGRAPHIC INSTITUTIONS DEEP-EARTH SAMPLING - JOIDES -

F. F. KOCZY
NSF-GP-3575
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2055 1 FIELD 8D, 8G

OLD DOMINION COLLEGE, UNDERGRADUATE SCHOOL, CHEMISTRY, VIRGINIA

VOLCANICS AND RELATED GRANITES

M. L. BOTTINO
NSF-GP-3605
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2076 1 FIELD 8K, 8G

CAL INST OF TECHNOLOGY, GRADUATE SCHOOL, GEOLOGICAL SCIENCES, CALIFORNIA

EXPERIMENTAL OBSERVATIONS OF THE EARTHS FREE OSCILLATIONS

S. W. SMITH
NSF-GP-3640
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2080 1 FIELD 8D, 8G

WESTERN RESERVE UNIV, GRADUATE SCHOOL, GEOLOGY, OHIO

THE CHRONOLOGY OF BATHOLITHIC EMPLACEMENT

P. O. BANKS

NSF-GP-3638
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GUW 141 FIELD 13G, 7D, 8D, 8H

WEST VIRGINIA UNIV, GRADUATE SCHOOL, GEOLOGY + GEOGRAPHY, WEST VIRGINIA

GEOCHEMICAL BEHAVIOR OF IRON AND MANGANESE IN A RESERVOIR FED BY STREAMS CONTAINING ACID MINE DRAINAGE

R. G. CORBETT

INT-WR-A-008-WVA
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 189 FIELD 8H, 8+, 9+, 9A

UNIVERSITY OF NEVADA, GRADUATE SCHOOL, DESERT RESEARCH INST, NEVADA

ANALOG COMPUTER COMPONENTS

G. B. MAXEY, P. A. DOMENICO

INT-WR-A-003-NEV
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 205 FIELD 8F, 8H

PURDUE UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, INDIANA

HYDRAULICS OF FLOW IN MEANDERING RIVERS WITH FLOOD-PLAINS

G. H. TOEBES
INT-A-003-IND
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 206 FIELD 13F, 8H,12A,13M

PURDUE UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, INDIANA

ESTIMATION OF RUNOFF FROM SMALL WATERSHEDS IN INDIANA

J. W. DELLEUR
INT-A-001-IND
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 256 FIELD 8F, 8H

PENNSYLVANIA ST UNIV, SCHOOL OF FORESTRY, FOREST MGT + UTILIZ, PENNSYLVANIA

CHARACTERISTICS OF STREAM FLOW OF SMALL WATERSHEDS IN PENNSYLVANIA AND INFLUENCING FACTORS

W. E. SOPPER
INT-A-006-PA
7/65- 6/66

INTERIOR-OFFICE OF WATER RESOURCES

GUW 261 FIELD 13G,20D

COLORADO STATE UNIV, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, COLORADO

THE EFFECTS ON BANK STABILITY OF TURBULENCE, SUSPENDED SEDIMENT DISTRIBUTION AND GROUND WATER MOVEMENT

D. B. SIMONS, H. W. SHEN
INT-B-003-COLO
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 262 FIELD 8H, 5C, 8E,12A

COLORADO STATE UNIV, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, COLORADO

FLOODS FROM SMALL WATERSHEDS

B. M. REICH, G. L. SMITH
V. M. YEVDJEVICH
INT-B-005-COLO
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 265 FIELD 13B, 8F, 8H, 8G

UNIV OF MINNESOTA, SCHOOL OF AGR FOR H EC, AGRIC ENGINEERING, MINNESOTA

THE EFFECT OF THE NATURAL SEALING OF POTHOLES UPON WATER MOVE-MENT AND GROUNDWATERRESOURCE

P. W. MANSON, E. R. ALLRED
G. M. SCHWARTZ
INT-B-002-MINN
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 273 FIELD 13G, 8H,20D

UNIV OF WISCONSIN, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, WISCONSIN

CIRCULATION AND MIXING PROCESSES IN LAKES

J. A. HOOPES

INT-A-004-WIS
/66- /

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NIL 103 FIELD 13B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

BEHAVIOR OF SOIL DEPOSITS AS DETERMINED FROM CASE HISTORIES

R. B. PECK, M. T. DAVISSON, D. U. DEERE
E. L. DIBIAGIO, K. S. FLAATE
H. O. IRELAND, D. J. PALLADINO
/65- /

ILLINOIS, UNIVERSITY OF

NIL 105 FIELD 8H,12A, 8E

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

STUDY OF NONLINEARITY OF HYDROGRAPH THEORY BY LAPLACE TRANSFORMATION

V. T. CHOW, A. BEN, M. H. DISKIN
/65- /

ILLINOIS, UNIVERSITY OF

NIL 123 FIELD 13G,13B,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

STUDIES IN CLOSE-RANGE AND MICRO PHOTOGRAMMETRY

H. M. KARARA, V. J. MCDONALD
/65- /

ILLINOIS, UNIVERSITY OF

NIL 124 FIELD 8H,12A, 8E

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

STOCHASTIC ANALYSIS OF RAINFALL-RUNOFF RELATIONSHIP

V. T. CHOW, S. RAMASESHAN
/65- /

ILLINOIS, UNIVERSITY OF

NIL 125 FIELD 8H,12A, 8E

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

HYDROLOGIC ANALYSIS BY ANALOG COMPUTERS

V. T. CHOW, J. J. FRIED, T. PRASAD
A. R. RAO
/65- /

ILLINOIS, UNIVERSITY OF

NIL 126 FIELD 8H,12A, 8E

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

SYSTEMS ANALYSIS OF RAINFALL AND RUNOFF RELATIONSHIP

V. T. CHOW, V. C. KULANDAISWAMY
/65- /

ILLINOIS, UNIVERSITY OF

NIL 129 FIELD 8H,12A, 8E

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

OVERLAND FLOW RELATIONSHIPS FOR NON-UNIFORM RAINFALL EXCESS
M. B. MCPHERSON
/65- /
ILLINOIS, UNIVERSITY OF

NIL 167 FIELD 8F, 8G

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

STABILITY OF STEEP ROCK SLOPES IN THE BIGHORN MOUNTAINS, WYOMING
D. U. DEERE, D. W. DEERE, F. D. PATTON
/65- /
ILLINOIS, UNIVERSITY OF

NUS 20 FIELD 8D, 8G, 5A,20F

UTAH ST UNIV OF AGRIC, GRADUATE SCHOOL, PHYSICS, UTAH

NON-LINEARITY OF THE X-RAY SCATTERING FROM NATURAL CLAY

A. MILLER
7/65- 6/66

UTAH STATE UNIVERSITY

PW 854 FIELD 8D, 8G

INDIANA UNIVERSITY, INDIANA

A SEDIMENTOLOGICAL AND PALEOECOLOGICAL STUDY OF MIDDLE CHESTER STRATA IN SOUTHERN INDIANA

L. H. BALTHASER
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 863 FIELD 8F

UNIV OF WISCONSIN, WISCONSIN

SOLIFLUCTION MOVEMENT RATES

J. B. BENEDICT
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 873 FIELD 8D, 8G

CORNELL UNIVERSITY, GRADUATE SCHOOL, GEOLOGY + GEOGRAPHY, NEW YORK

STRATIGRAPHY AND PALEONTOLOGY OF THE NACO FORMATION OF CENTRAL ARIZONA

D. C. BREW
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 875 FIELD 8G

KANSAS ST UNIV AGR SCI, GRADUATE SCHOOL, GEOLOGY + GEOGRAPHY, KANSAS

RB-SR GEOCHRONOLOGICAL INVESTIGATIONS OF SOME PERIDOTITE PLUGS, RILEY COUNTY, KANSAS

D. G. BROOKINS
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 876 FIELD 8G

UNIV OF CAL-BERKELEY, CALIFORNIA

PETROLOGY OF GREENSCHIST FACIES ROCKS IN EASTERN OTAGO, NEW ZEALAND

E. H. BROWN
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 877 FIELD 8G

YALE UNIVERSITY, CONNECTICUT

STRATIGRAPHY, STRUCTURE, AND PETROLOGY OF METASEDIMENTS AND GNEISSES COVERING BULK OF TAFJORD AREA

H. K. BRUECKNER
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 878 FIELD 8F

WESTERN RESERVE UNIV, OHIO

GEOMORPHOLOGY OF THE SANGRE DE CRISTO MOUNTAINS, SAN MIGUEL COUNTY, NEW MEXICO

J. E. BUGH
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 879 FIELD 8G

WESTERN RESERVE UNIV, GRADUATE SCHOOL, GEOLOGY, OHIO

QUANTITATIVE PETROLOGY OF THE RED RAPAKIVI GRANITES OF NORTHEASTERN WISCONSIN

J. A. CAIN
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 883 FIELD 8D, 8G

STATE UNIV N Y BUFFALO, GRADUATE SCHOOL, GEOLOGICAL SCIENCES, NEW YORK

SEDIMENTARY PETROLOGY OF PLEISTOCENE GLACIAL DEPOSITS OF ERIE COUNTY AND VICINITY, NEW YORK

C. J. CAZEAU
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 884 FIELD 8D

MUS OF PETRIFIED WOOD, NEW YORK

SEARCH FOR LAND PLANTS FROM THE SILURIAN OF NEW YORK STATE

S. J. CIURCA
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 886 FIELD 8G

UNIV OF TEXAS, AUSTIN, TEXAS

GEOLOGY AND STRUCTURAL INTERPRETATION OF THE CHIQUIMULA AREA, GUATEMALA

R. E. CLEMONS
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 888 FIELD 8D, 8G

UNIV OF CAL-LA JOLLA, CALIFORNIA

PETROLOGY AND GEOCHEMISTRY OF THE LATE PRECAMBRIAN ROCKS OF THE NORTHEASTERN GREAT BASIN
K. C. CONDIE
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 891 FIELD 8D, 8G

BROWN UNIVERSITY, RHODE ISLAND

THE PALEOECOLOGY OF A MARINE ALGAL BANK IN THE WYANDOTTE FORMATION - UPPER PENNSYLVANIAN - OF EASTERN KANSAS
D. J. CROWLEY
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 892 FIELD 8D

UNIV OF NORTH CAROLINA, NORTH CAROLINA

CONODONTS FROM THE LINCOLNSHIRE FORMATION - MIDDLE ORDOVICIAN OF VIRGINIA
H. A. CURRAN
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 897 FIELD 8F

YALE UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, CONNECTICUT

GLACIAL GEOLOGY OF THE NORTHEASTERN BORDER OF THE ST. ELIAS MOUNTAINS, YUKON TERRITORY, CANADA
G. H. DENTON
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 902 FIELD 8F, 8G

UNIVERSITY OF ILLINOIS, ILLINOIS

STRUCTURE, PETROLOGY, AND STRATIGRAPHY OF VOLCANIC AND SEDIMENTARY SEQUENCE OF COASTAL MAINE

G. M. DOW
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 905 FIELD 8D, 8G

UNIVERSITY NEW MEXICO, NEW MEXICO

TERTIARY VOLCANIC AND STRUCTURAL GEOLOGY OF THE SAN MATEO MOUNTAINS OF WEST-CENTRAL NEW MEXICO

S. E. FARKAS
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 915 FIELD 8D, 8G

UNIVERSITY OF MISSOURI, MISSOURI

PETROLOGY AND GEOCHEMISTRY OF SOME IGNEOUS AND METAMORPHIC ROCKS IN NORTH-CENTRAL ALASKA
R. L. FOSTER
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 917 FIELD 8F, 8G

YALE UNIVERSITY, GRADUATE SCHOOL, CONNECTICUT

GLACIAL GEOLOGY OF THE UPPER MOHAWK REGION, NEW YORK
D. S. FULLERTON
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 924 FIELD 8D

UNIV OF ROCHESTER, NEW YORK

BRACHIOPODS IN THE ROSENDALE QUADRANGLE, IN THE RONDOUT FORMATION, SOUTHEASTERN NEW YORK
F. A. GROSVENOR
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 929 FIELD 8G

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, TEXAS

STRUCTURAL GEOLOGY AND STRATIGRAPHY, CANON DE NAVARETTE, CHIHUAHUA, MEXICO

W. T. HAENGGI
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 930 FIELD 8D, 7B

YALE UNIVERSITY, GRADUATE SCHOOL, CONNECTICUT

THE APPLICATION OF OXYGEN ISOTOPES TO ECONOMIC GEOLOGY

R. A. HART
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 933 FIELD 8D, 8F, 8G

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RECENT COASTAL SEDIMENTS OF BRITISH HONDURAS

L. R. HIGH
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 934 FIELD 8D, 8F

UNIV OF WASHINGTON, WASHINGTON

PLEISTOCENE GLACIATION OF INGALLS CREEK VALLEY, EAST-CENTRAL CASCADE RANGE, WASHINGTON

K. D. HOPKINS
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 943 FIELD 8G

COLORADO SCH OF MINES, COLORADO

STRUCTURE OF THE HOWELL CREEK WINDOW AND ADJACENT AREA

P. B. JONES
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 948 FIELD 8N, 8G

MICHIGAN STATE UNIV, MICHIGAN

THE CONTRIBUTION OF NON-FERROMAGNETIC MINERALS TO THE TOTAL MAGNETIC SUSCEPTIBILITY OF THE MELLON GRANITE

M. M. KATZMAN
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 950 FIELD 8F, 8N, 8G

UNIVERSITY OF OREGON, OREGON

GRAVITY AND PETROGRAPHIC INVESTIGATIONS OF THE MAJOR TECTONIC ELEMENTS IN THE KLAMATH MOUNTAINS OF SOUTHWESTERN OREGON

M. A. KAYS
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 954 FIELD 8D, 8G

MICHIGAN STATE UNIV, MICHIGAN

MICROFLORAL ELEMENTS AND PALYNOLOGICAL ZONATION OF THE PIERRE SHALE - GULFIAN OF THE NORTHERN MID-CONTINENT REGION

J. M. LAMMONS
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 970 FIELD 8D, 8G

BROWN UNIVERSITY, RHODE ISLAND

A SEDIMENTOLOGICAL ANALYSIS OF CERTAIN ROCKS OF THE HAMILTON GROUP - DEVONIAN

I. N. MCCAVE
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 971 FIELD 8D, 8G

NEW YORK UNIVERSITY, NEW YORK

SEDIMENTARY AND PALEONTOLOGIC CHANGES ACROSS THE UPSTREAM LIMIT OF THE HUDSON RIVER ESTUARY

A. W. MCCRONE
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SOCIETY SIGMA XI + SC RES SOC AMER

PW 979 FIELD 8G

INDIVIDUAL GRANTS, CANADA

DATING TWO OROGENIC EVENTS IN THE GEOLOGICAL HISTORY OF AN AREA NEAR MANITOUWADGE, IN N.W. ONTARIO, CANADA
H. C. MORRIS
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 984 FIELD 8D, 8G

WESTERN RESERVE UNIV, OHIO

A PALEOECOLOGIC STUDY OF A POTENTIAL OIL BEARING REEF IN WESTERN CANADA

J. P. NOBLE
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 985 FIELD 8D

UNIV OF MINNESOTA, MINNESOTA

ACID-INSOLUBLE MICROFOSSIL INVESTIGATION OF UPPER AND MIDDLE DEVONIAN FORMATIONS IN IOWA

N. J. NORTON
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 986 FIELD 8D, 8G

MICHIGAN STATE UNIV, MICHIGAN

PETROLOGY AND GEOCHEMISTRY OF THE MELLEN GABBRO, NORTHERN WISCONSIN

J. F. OLMSTEAD
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 987 FIELD 8D

UNIV OF MINNESOTA, GRADUATE SCHOOL, MINNESOTA

A PALYNOLOGICAL ANALYSIS OF UPPER CRETACEOUS AND LOWER TERTIARY DEPOSITS IN CARTER COUNTY, MONTANA
D. F. OLTZ
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 991 FIELD 8D, 8G

UNIV OF MASSACHUSETTS, MASSACHUSETTS

STRUCTURAL GEOMETRY OF THE FULLY BODY OF MONSON GNEISS

T. M. PIKE
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 993 FIELD 8G

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STRATIGRAPHIC AND TECTONIC HISTORY OF THE MEMRAMCOOK FORMATION OF NON-MARINE REDBEDS OF NEW BRUNSWICK, CANADA

G. M. POPPER
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 997 FIELD 8D, 8G, 7B

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THE ISOTOPIC COMPOSITION OF STRONTIUM IN VOLCANIC ROCKS

P. D. PUSHKAR
9/64- 8/65

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PW 1003 FIELD 8G

VIRGINIA POLYTECH INST, VIRGINIA

A PETROLOGIC STUDY OF THE INDEPENDENCE IGNEOUS MASS

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9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 1004 FIELD 8H

KENT STATE UNIVERSITY, GRADUATE SCHOOL, OHIO

A FIVE YEAR LIMNOLOGICAL STUDY OF A NEWLY CREATED ACID MINE WATER IMPOUNDMENT

C. V. RILEY
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 1005 FIELD 8G

VILLANOVA UNIVERSITY, GRADUATE SCHOOL, PENNSYLVANIA

TIME AND MODE OF THRUSTING OF ALLOCHTHONOUS WESTERN FACIES ON THE H D RANGE, SOUTHEAST OF CONTACT, NEVADA

J. RIVA
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 1008 FIELD 8D, 8G

OREGON STATE UNIV, OREGON

BIOSTRATIGRAPHY AND PALEOECOLOGY OF THE MIDDLE TERTIARY EMBAYMENT, NEWPORT, OREGON

G. H. ROOTH
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 1011 FIELD 8G

COLORADO SCH OF MINES, COLORADO

STRUCTURAL HISTORY OF THE ELKHORN THRUST AND ITS BEARING ON THE EVOLUTION OF SOUTH PARK AND WESTERN FRONT RANGE

D. L. SAWATZKY
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 1013 FIELD 8D, 8G

UNIV OF CAL-SANTA BARB, UNDERGRADUATE SCHOOL, CALIFORNIA

STRATIGRAPHY, PETROLOGY AND DISPERSAL SYSTEMS OF THE LOWER ELLENSBURG FORMATION IN SOUTH-CENTRAL WASHINGTON

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9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 1015 FIELD 8D, 8G

BROWN UNIVERSITY, RHODE ISLAND

THE CHEMICAL, MINERALOGICAL, AND STRUCTURAL EVOLUTION OF A CONCORDANT GRANITIC PLUTON NEAR MILFORD, MASSACHUSETTS

C. E. SHAW
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 1016 FIELD 8D

UNIV OF MINNESOTA, MINNESOTA
POLLEN AND SPORES OF THE JUDITH RIVER FORMATION, THE TYPE LOCALITY, IN CENTRAL MONTANA
R. E. SMOEMAKER
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

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LANDSLIDES OF UTAH
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9/64- 8/65
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PW 1018 FIELD 8D, 8G

COLORADO SCH OF MINES, COLORADO

THE MINERAL DEPOSITS AND HYDROTHERMAL ROCK ALTERATION OF THE ROSITA HILLS, CUSTER COUNTY, COLORADO
P. L. SIEMS
9/64- 8/65

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PW 1022 FIELD 8G

STANFORD UNIVERSITY, GRADUATE SCHOOL, CALIFORNIA

IGNEOUS AND METAMORPHIC PETROLOGY-MINERALOGY OF AN AREA SOUTH OF YOSEMITE NATIONAL PARK, CALIFORNIA

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9/64- 8/65

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PW 1027 FIELD 8D

UNIVERSITY OF KANSAS, KANSAS

THE SPIRIFERIDS OF THE PENNSYLVANIAN OF TEXAS
R. S. SPENCER
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 1034 FIELD 8D, 8G, 7B

UNIV OF CAL-LA JOLLA, CALIFORNIA

A STRONTIUM ISOTOPE AND TRACE ELEMENT STUDY OF ULTRAMAFIC ROCKS

A. M. STUEBER
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 1043 FIELD 8G

OREGON STATE UNIV, GRADUATE SCHOOL, OREGON

THE PRE-TERTIARY GEOLOGY OF THE SOUTHEASTERN WALLOWA MOUNTAINS, OREGON, AND THE SOUTHWESTERN SEVEN DEVILS MOUNTAINS, IDAHO

T. L. VALLIER
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 1052 FIELD 8D, 8G

MICHIGAN STATE UNIV, MICHIGAN

PALYNOLOGICAL INTERPRETATION OF THE NAVARRO GROUP SEDIMENTS - UPPER CRETACEOUS - OF TEXAS
J. B. ZAITZEFF
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

TL 350 FIELD 8D

SOUTH DAKOTA SCH MINES, UNDERGRADUATE SCHOOL, GEOLOGY, SOUTH DAKOTA

A STUDY OF EUROPEAN FOSSIL COLLECTIONS IN FRANCE
M. GREEN
5/65- 4/66

AMERICAN PHILOSOPHICAL SOCIETY

UT 487 FIELD 7C, 7A, 7D

SYRACUSE UNIVERSITY, MISCELLANEOUS SCHOOLS, FOREST CHEMISTRY, NEW YORK

BEHAVIOR OF ORGANOMETALLIC COMPOUNDS IN LOW DIELECTRIC CONSTANT MEDIA

J. SMID

1/65-12/65

RESEARCH CORP-WILLIAMS-WATERMAN FUND

YIL 249 1 FIELD 8D, 8G

STATE, GEOL SURV URBNA, ILLINOIS

SUBSURFACE GEOLOGY AND COAL RESOURCES OF THE PENNSYLVANIA SYSTEM

J. A. SIMON, K. E. CLEGG, M. E. HOPKINS
W. H. SMITH
/65- /

STATE-ILLINOIS

YIN 234 FIELD 8N, 8F, 8K, 8H

IND GEOLOGICAL SURVE, INDIANA

SEISMIC REFRACTION STUDIES IN EAST-CENTRAL INDIANA

M. E. BIGGS
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STATE-INDIANA

ZPE 752 2 FIELD 13B, 8G,12A, 8E

US, AEC, LAMONT, ILLINOIS

SOIL TEMPERATURE STUDIES

J. E. CARSON, H. MOSES
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AEC-BIOLOGY + MEDICINE

ZTA 237 1 FIELD 8C

US, SMITHSONIAN INST, DIST OF COLUMBIA

SORTING OF COLLECTIONS FROM THE INTERNATIONAL INDIAN OCEAN EXPEDITION

H. A. FEHLMANN
11/65-11/66

SMITHSONIAN INSTITUTION

ZUA 357 2 FIELD 8D, 8G

USDI, GEOL SURV, DIST OF COLUMBIA

FAIRBANKS QUATERNARY GEOLOGY, ALASKA

T. L. PEWE
GS-5806
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INTERIOR-GEOLOGICAL SURVEY

09. Electronics and Electrical Engineering

GSE 465 2 FIELD 9+,12A

UNIVERSITY OF ARIZONA, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, ARIZONA

ENGINEERING APPLICATIONS OF THE SECOND METHOD OF LIAPUNOV

D. G. SCHULTZ

NSF-GP-2237
10/65-10/66

NSF-ENGINEERING SCIENCES DIVISION

JIL 1 FIELD 9+, 9C,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, ILLINOIS
STABILITY OF POWER LINES
G. COSTELLO
/65- /

ILLINOIS POWER COMPANY

NIL 89 FIELD 9+

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, ILLINOIS

DEVELOPMENT OF LABORATORY FACILITIES AND TECHNIQUES FOR ROUTINE MEASUREMENTS OF RESISTANCE AND OTHER ELECTRICAL QUANTITIES
W. O. RISLEY, H. N. HAYWARD
/65- /

ILLINOIS, UNIVERSITY OF

NIL 90 FIELD 9+

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, ILLINOIS

DETERMINATION OF OPTIMUM PROCEDURES FOR ROUTINE CHECKING OF ELECTRICAL MEASUREMENT STANDARDS AND INSTRUMENT CALIBRATION
H. N. HAYWARD, W. O. RISLEY
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ILLINOIS, UNIVERSITY OF

NIL 91 FIELD 9+

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, ILLINOIS

THE DESIGN AND CONSTRUCTION OF FAIL-SAFE AND OVERLOAD-PROOF WORKING STANDARDS EQUIPMENT
H. N. HAYWARD, W. O. RISLEY
/65- /

ILLINOIS, UNIVERSITY OF

NIL 127 FIELD 5A,12A, 5C

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

ECONOMIC USE OF MEDIUM-SIZED COMPUTERS IN THE CONTRACTORS OFFICE
L. R. SHAFFER
/65- /

ILLINOIS, UNIVERSITY OF

VX 208 1 FIELD 12A

UNIV OF ALBERTA, SCHOOL OF MEDICINE, MEDICINE, CANADA

ESTABLISHMENT OF I. B. M. DATA PROCESSING CENTRE
R. S. FRASER
65-8
7/65- 6/66

CANADA HEART ASSOCIATION

ZUF 268 FIELD 9+, 9C,12A

USDI, BUR RECLAM, DENVER, COLORADO

HIGH-VOLTAGE D-C TRANSMISSION SIMULATOR

R. R. FILLENBERG, W. J. HANNA, L. A. POOK
DR-228
/66- /

INTERIOR-BUREAU OF RECLAMATION

ZUF 269 FIELD 9+, 9A

USDI, BUR RECLAM, DENVER, COLORADO

TRANSIENT PERFORMANCE OF SERIES COMPENSATED TRANSMISSION LINES
R. R. FILLENBERG, C. CHULLAKESA
W. J. HANNA, L. W. LLOYD
DR-228
/66- /
INTERIOR-BUREAU OF RECLAMATION

10. Energy Conversion (Non-propulsive)

PH 982 FIELD 9C

UNIVERSITY OF DACCA, PAKISTAN

CERTAIN OPTIMIZATION PROBLEMS IN ELECTROMECHANICAL ENERGY CONVERSION
S. A. NASAR
9/64- 8/65
SOCIETY SIGMA XI + SC RES SOC AMER

11. Materials

GYE 130217 2 FIELD 11L

PURDUE UNIVERSITY, AGRICULTURAL EXPT STA, FORESTRY + CONSERV, INDIANA

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FACTORS THAT AFFECT THE DIRECT SPINNING SYSTEM OF COTTON

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ZYA 28127 1 FIELD 7C, 7D,11G

USDA, PEORIA, ILLINOIS

THE SYNTHESIS AND PROPERTIES OF CROSSLINKED STARCH DERIVATIVES FOR USE IN PAPER
R. A. BUCHANAN
AG-N01-01-0247
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THE SYNTHESIS AND PROPERTIES OF CROSSLINKED STARCH DERIVATIVES FOR USE IN PAPER

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SYNTHESIS AND PROPERTIES OF CROSSLINKED STARCH DERIVATIVES FOR USE IN PAPER PRODUCTS

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ZYA 32198 1 FIELD 7C, 7D,11G, 7B

USDA, OLUSTEE, FLORIDA

POLYMERIZABLE MONOMERS FOR VINYL AND CONDENSATION-TYPE POLYMERS FROM TERPENE ACIDS

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AG-S05-02-0055
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AGRICULTURE-DEPT OF AGRICULTURE

12. Mathematical Sciences

GSM 305 2 FIELD 12A

WASHINGTON UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, MISSOURI

SELF-ADJOINT DIFFERENTIAL OPERATORS, TOEPLITZ FORMS, UNIVALENT FUNCTIONS
A. DEVINATZ, I. I. HIRSCHMAN
J. A. JENKINS, A. E. NUSSBAUM
NSF-GP-3583
10/65-10/66

NSF-MATHEMATICAL SCIENCES DIVISION

GSM 306 2 FIELD 12A

WESLEYAN UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, CONNECTICUT

TOPOLOGICAL DYNAMICS

R. ELLIS, W. H. GOTTSCHALK, H. TONG

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NSF-MATHEMATICAL SCIENCES DIVISION

GSM 357 2 FIELD 12A

CORNELL UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

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NSF-MATHEMATICAL SCIENCES DIVISION

GSM 474 2 FIELD 12A

UNIV OF PENNSYLVANIA, GRADUATE SCHOOL, MATHEMATICS, PENNSYLVANIA

MODERN GEOMETRIC METHODS IN ALGEBRA

M. GERSTENHABER

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10/65-10/66

NSF-MATHEMATICAL SCIENCES DIVISION

GSM 504 1 FIELD 12A, 5C

UNIV OF WASHINGTON, GRADUATE SCHOOL, MATHEMATICS, WASHINGTON

CONVEXITY AND FUNCTIONAL ANALYSIS

V. L. KLEE

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10/65-10/66

NSF-MATHEMATICAL SCIENCES DIVISION

GSM 505 1 FIELD 12A

YESHIVA UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

DIFFERENTIAL GEOMETRY IN THE LARGE

H. E. RAUCH

NSF-GP-3661
10/65-10/66

NSF-MATHEMATICAL SCIENCES DIVISION

GSM 506 1 FIELD 12A

UNIVERSITY OF FLORIDA, GRADUATE SCHOOL, MATHEMATICS, FLORIDA

CONTINUOUS AND DISCRETE CLASSIFICATION

A. R. BEDNAREK, A. D. WALLACE

NSF-GP-3623
10/65-10/66

NSF-MATHEMATICAL SCIENCES DIVISION

GSM 507 1 FIELD 12A

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, MATHEMATICS, MARYLAND

NUMERICAL ANALYSIS

J. H. BREMBLE

NSF-GP-3666
10/65-10/66

NSF-MATHEMATICAL SCIENCES DIVISION

GSM 508 1 FIELD 12A

STANFORD UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

FUNCTION SPACES AND ALGEBRAS ON GROUPS

K. DELEEUW

NSF-GB-3617
10/65-10/66

NSF-MATHEMATICAL SCIENCES DIVISION

GSM 510 1 FIELD 12A

NORTHEASTERN UNIV, GRADUATE SCHOOL, MATHEMATICS, MASSACHUSETTS

THEORY OF FINITE GROUPS

D. GORENSTEIN

NSF-GP-3701
11/65-11/66

NSF-MATHEMATICAL SCIENCES DIVISION

GSM 511 1 FIELD 12A

SYRACUSE UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

TOPOLOGICAL LOOPS WITH VARIOUS INVARIANT UNIFORMITIES

S. N. HUDSON

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10/65-10/66

NSF-MATHEMATICAL SCIENCES DIVISION

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UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

PROPERTIES OF THE REES RING OF A LOCAL DOMAIN

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NSF-MATHEMATICAL SCIENCES DIVISION

GSM 516 1 FIELD 12A

NEW MEX STATE UNIV, GRADUATE SCHOOL, MATHEMATICS, NEW MEXICO

ABELIAN GROUPS

E. A. WALKER, C. L. WALKER

NSF-GP-3581
10/65-10/66

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GSM 518 1 FIELD 12A

YESHIVA UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

ANALYSIS IN THE LARGE

L. AUSLANDER

NSF-GP-3654
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STATE, GAME-FW FISH CM, TALLAHASSEE, FLORIDA

MACHINE PROCEDURES COORDINATION

F. K. JONES

INT-FA-W-33-R-16-2-E
7/65- 6/66

INTERIOR-BUREAU SPORT FISH WLIFE-FED AID

NIL 37 FIELD 5C,13M

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, ENGINEERING, ILLINOIS

BATCH-FLOW SCHEDULING FOR A JOB SHOP

D. E. SCHECK, J. BROWN
/65- /

ILLINOIS, UNIVERSITY OF

PW 903 FIELD 12A

NORTHEAST LA ST COLL, UNDERGRADUATE SCHOOL, MATHEMATICS, LOUISIANA

AN EXTENSION OF THE CAUCHY RATIONAL FUNCTION INTERPOLATION FORMULA

D. E. DUPREE
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 977 FIELD 12A

UNIV OF MINNESOTA, MINNESOTA

CALCULATION WITH HIGH ACCURACY OF RANK ORDER PROBABILITIES FOR THE CASE OF SAMPLES FROM TWO NORMAL POPULATIONS

R. C. MILTON
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

ZXA 650197 FIELD 12A

U S PUBLIC HEALTH SERV, MARYLAND

DEVELOPMENT OF STATISTICAL TECHNIQUES AND THEORY

S. GEISSER
/65- /

PHS-NIH-NATL INST ARTHRITIS + METAB DIS

ZXA 650198 FIELD 12A, 6D

U S PUBLIC HEALTH SERV, MARYLAND

DEVELOPMENT AND APPLICATION OF STATISTICAL TECHNIQUES AND THEORY

C. D. ROBERTS
/65- /

PHS-NIH-NATL INST ARTHRITIS + METAB DIS

13. Mechanical, Industrial, Civil, and Marine Engineering

7GX 1189 2 FIELD 13B, 7C, 7D

POLYTECH INST BROOKLYN, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, NEW YORK

ADVANCE WASTE TREATMENT BY ULTRAFILTRATION

P. F. BRUINS, B. BORGERSON, H. P. GREGOR
N. E. MORGANSON, A. A. SOMMERS

7-WP-00620-02
9/65- 8/66

PHS-BSS

7GX 2915 1 FIELD 13B, 7D, 7C, 7B

MARQUETTE UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, WISCONSIN

EFFLUENT DEOXYGENATION AT DIFFERENT TEMPERATURES

A. E. ZANONI

7-WP-00829-01
9/65- 8/66

PHS-BSS

7GX 3018 1 FIELD 13A,13B, 7C, 7D

UNIVERSITY OF COLORADO, GRADUATE SCHOOL, CHEMISTRY, COLORADO

GAS CHROMATOGRAPHY OF OXIDANTS IN AIR POLLUTION
P. URONE

7-AP-00423-01
6/65- 5/66

PHS-BSS

7GX 3390 1 FIELD 13B, 7D, 7B

UNIVERSITY OF MICHIGAN, SCHOOL OF PUBLIC HLTH, ENVIRONMENTAL HEALTH, MICHIGAN

OXYGEN DETERMINATION IN NATURAL WATERS AND WASTES

K. H. MANCY, K. S. ANN, H. MARKS
E. SOWENSKI
7-WP-886-01
9/65- 8/66

PHS-BSS

7GX 3900 1 FIELD 13B, 7C, 7D

CAL INST OF TECHNOLOGY, SCHOOL OF ENGINEERING, CALIFORNIA

FLOCCULATION BEHAVIOR OF DILUTE CLAY-POLYMER SYSTEMS

J. J. MORGAN, F. B. BIRKNER
7-WP-00942-01
9/65- 4/66

PHS-BSS

GUC 139 FIELD 11F,20D

UNIV OF CAL-BERKELEY, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, CALIFORNIA

A MASS TRANSFER STUDY OF CURRENT REQUIREMENTS FOR CATHODIC PROTECTION
I. CORNET
/66- /

INTERIOR-OFFICE OF SALINE WATER

GUW 110 FIELD 13B,11G

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, TEXTILES, NORTH CAROLINA

RECOVERABLE WARP SIZES - AFEASIBILITY STUDY

H. Y. JENNINGS, R. N. BERRIER, A. FULLER
INT-WR-A-006-NC
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 210 FIELD 13G,13d

UNIV OF PUERTO RICO, SCHOOL OF ENGINEERING, ENGINEERING, PUERTO RICO

QUANTITATIVE ANALYSIS OF WATER USE PATTERNS IN PUERTO RICO

A. SANTIAGOVAZQUEZ, M. F. DEVERA
A. GUILBE

INT-A-003-PR
7/65- 6/66

INTERIOR-OFFICE OF WATER RESOURCES

GUW 213 FIELD 8H,12A, 8E

CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, HYDRAUL + HYDRAUL ENG, NEW YORK

HYDROLOGIC SYSTEMS ANALYSIS OF THE GREAT LAKES
W. BRUTSAERT

INT-A-009-NY
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INTERIOR-OFFICE OF WATER RESOURCES

GUW 215 FIELD 13G

CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, NEW YORK

THE HYDRAULICS OF CHANNELS, CONNECTING TWO RESERVOIRS.
W. H. GRAF

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9/65- 6/66

INTERIOR-OFFICE OF WATER RESOURCES

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STATE, RESOURC RES CTR, VERMONT

BOTTOM SEDIMENTS OF LAKE CHAMPLAIN

A. S. HUNT, A. *. HUNT
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GUW 230 FIELD 8H, 8G,12A, 8E

LOUISIANA ST UNIV A+M, SCHOOL OF ENGINEERING, PETROLEUM ENGINEERING, LOUISIANA

FRESH WATER STORAGE IN SALINE AQUIFERS

O. K. KIMBLER, M. F. HAWKINS
INT-A-002-LA
4/65- 3/66

INTERIOR-OFFICE OF WATER RESOURCES

GUW 240 FIELD 13B, 7C, 7D

UNIV OF NORTH DAKOTA, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, NORTH DAKOTA

WATER POLLUTION ABATEMENT BY IMPROVED COAGULATION OF EFFLUENTS FROM LYE-PEEL POTATO PROCESSING PLANTS

G. O. FOSSUM, A. M. COOLEY, G. *. FOSSUM
INT-A-002-NDAK
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 247 FIELD 8H, 5C, 8E

COLORADO STATE UNIV, GRADUATE SCHOOL, ECONOMICS, COLORADO

ECONOMICS OF GROUND WATER DEVELOPMENT IN THE HIGH PLAINS OF COLORADO

P. W. BARKLEY, M. W. BITTINGER
R. S. CREELY, L. M. HARTMAN
R. A. LONGENBAUGH, S. C. SMITH
INT-B-998-COLO
/66- /

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GUW 258 FIELD 13G,13B, 8D, 8H

COLORADO STATE UNIV, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, COLORADO

EVALUATION OF NATURAL RECHARGE TO THE GROUND WATER IN THE OGALLALA FORMATION OF NORTHEASTERN COLORADO
R. A. LONGENBAUGH, M. W. BITTINGER
INT-B-002-COLO
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GUW 274 FIELD 13B,11G

GEORGIA INST OF TECH, SCHOOL OF ENGINEERING, WATER RESOURCES, GEORGIA

SURVEY OF THE NATURE AND MAGNITUDE OF THE WATER RESEARCH NEEDS OF THE TEXTILE INDUSTRY OF GEORGIA

W. L. HYDEN, W. *. HYDEN, R. S. INGOLS
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GUW 275 FIELD 8H,12A, 8E

GEORGIA INST OF TECH, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, GEORGIA

EFFICIENT DESIGN AND UTILIZATION OF RAINFALL NETWORKS

W. M. SNYDER, B. M. COURTNEY
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GUW 279 FIELD 8D, 8H, 8G

UNIVERSITY OF GEORGIA, GRADUATE SCHOOL, GEOLOGY, GEORGIA

THE ARTESIAN SYSTEM IN GEORGIA STRATIGRAPHY AND HYDROLOGY OF THE OCALA

M. RICH, R. E. CARVER, E. A. STANLEY
INT-A-006-GA
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GUW 290 FIELD 8D, 8H, 7B

OHIO STATE UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, OHIO

STRONTIUM ISOTOPE COMPOSITION AND TRACE ELEMENT CONCENTRATIONS IN LAKE HURON AND ITS PRINCIPAL TRIBUTARIES

G. FAURE
INT-B-004-OHIO
7/65- 6/66

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JHE 1 FIELD 13G, 8H

UNIV OF MINNESOTA, GRADUATE SCHOOL, CIVIL ENGINEERING, MINNESOTA

MODEL STUDY OF GURI DAM FOR HYDROELECTRIC DEVELOPMENT
A. G. ANDERSON, A. L. CHARBONNEAU
7/64- 6/65

HARZA ENGINEERING COMPANY

JHE 2 FIELD 13G

MODEL STUD. OF MANGLA DAM SPILLWAY
A. L. ANDERSON, W. Q. DAHLIN
5/64- 4/65

HARZA ENGINEERING COMPANY

NIL 3 FIELD 20L,20D,10B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS

JET OSCILLATOR
W. L. CHOW, E. F. BROWN, J. D. MCGEACHY
D. E. WOLLERSHEIM
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NIL 10 FIELD 20D,10B

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ANNULAR EJECTOR
W. L. CHOW, A. L. ADDY, R. E. EILERS
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NIL 16 FIELD 20M,12A,13M,20L

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS
CALCULATION OF AIR CONDITIONING LOADS USING A DIGITAL COMPUTER
W. F. STOECKER, M. E. KENT
/65- /

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NIL 17 FIELD 20D,10B

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DESIGN OF AIR CURTAINS

W. F. STOECKER, F. C. HAYES
/65- /

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NIL 18 FIELD 20L,20D,10B

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RESPONSE CHARACTERISTICS OF A SUPERHEAT-CONTROLLED EXPANSION VALVE
W. F. STOECKER, R. H. HENNINGER
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NIL 19 FIELD 20M,10B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, ENGINEERING, ILLINOIS

TRANSIENT OPERATION OF A THERMOELECTRIC REFRIGERATOR WITH SECONDARY FLUID BOILING AND CONDENSING LOOP

W. F. STOECKER, E. D. SMITH
/65- /

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NIL 20 FIELD 20L,20K,10B

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DYNAMIC STRENGTH OF MACHINE ELEMENTS IN COMPONENT ASSEMBLIES

E. I. RADZIMOVSKY, C. S. LARSON
D. M. OFFNER
/65- /

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NIL 21 FIELD 12A,20L,20D,10B

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INVOLUTE AND NON-INVOLUTE SPUR GEARS - T HEIR LOAD CAPACITIES BASED ON MAXIMUM PRESSURE, SLIDING VELOCITY AND CONDITIONS OF LUBRICATI

E. I. RADZIMOVSKY, T. M. BRITTAIN
/65- /

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NIL 22 FIELD 20L,20D,10B

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EXPERIMENTAL INVESTIGATION OF CHARACTERISTICS INFLUENCING PERFORMANCE OF SPUR GEAR DRIVES

E. I. RADZIMOVSKY, R. W. ADKINS, H. DIEME
A. O. LEBECK
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NIL 23 FIELD 20L,20D,10B

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THE EFFECT OF LOCAL TOOTH DEFORMATION ON THE LOAD-CARRYING CAPACITY OF THE HYDRODYNAMIC FILM BETWEEN INVOLUTE SPUR GEARS
E. I. RADZIMOVSKY, B. VATHAYANON
/65- /
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PROGRESSIVE AUTOMATION
W. F. BERKOW
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AUTOMATIC PROCESS DESIGN FOR METAL CUTTING
D. E. SCHECK
/65- /

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NIL 40 FIELD 13B, 5A

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AMERICAN STANDARDS FOR DRAWING AND DRAFTING PRACTICES
F. L. SPALDING, R. W. BOKENKAMP
/65- /

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NIL 77 FIELD 10B

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INVESTIGATION OF DRILL POINT GEOMETRY
K. J. TRIGGER, R. L. WILLIAMS
/65- /

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NIL 79 FIELD 20D,10B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS

HYDROSTATIC AIR BEARINGS IN ADAPTIVE CONTROL MACHINE SYSTEMS
B. F. VONTURKOVICH, H. H. KORST
W. WINTERBAUER
/65- /

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NIL 81 FIELD 20L,10B

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DYNAMIC ANALYSIS SYNTHESIS AND CONTROL OF MACHINE TOOLS
B. F. VONTURKOVICH, U. HINDHEDE, M. PLECK
T. SYTKO
/65- /

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NIL 82 FIELD 13H,11G,20L

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THEORETICAL AND EXPERIMENTAL INVESTIGATION OF EXTRUSION WITH SPECIAL REFERENCE TO FRICTION
B. F. VONTURKOVICH, R. GHOSH
K. J. TRIGGER
/65- /
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NIL 84 FIELD 20L,20K,10B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS
OPTIMIZATION OF RIGIDITY-WEIGHT RATIO IN LARGE PRECISION MACHINE ELEMENTS
B. F. VONTURKOVICH, J. SLUTZKY
/65- /
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NIL 85 FIELD 20D,10B

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LOAD CARRYING CAPACITY AND VISCOUS FRICTION LOSSES OF OIL FILMS IN HYDRODYNAMICALLY LUBRICATED GEARING
R. W. ADKINS, E. I. RADZIMOVSKY
/65- /

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NIL 86 FIELD 10B

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EXPERIMENTAL DETERMINATION OF THE FRICTIONAL CHARACTERISTICS OF BEARINGS
D. H. OFFNER, E. I. RADZIMOVSKY
/65- /

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NIL 87 FIELD 10B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS

THE INFLUENCE OF MISALIGNMENT UPON THE LIFE OF ROLLING-CONTACT BEARINGS
E. I. RADZIMOVSKY, J. W. BAYNE, H. DIEME
/65- /

ILLINOIS, UNIVERSITY OF

NIL 113 FIELD 13B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

FOUNDATIONS SUBJECTED TO DYNAMIC LOADING
W. J. HALL, N. E. FUNSTON
/65- /

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NIL 114 FIELD 12A,13M,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

DYNAMICS AND RELIABILITY OF STOCHASTIC STRUCTURAL SYSTEMS
A. H. ANG, M. AMIN, C. C. TUNG
/65- /

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NIL 128 FIELD 13G, 8H,12A, 5C

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

WATER RESOURCES SYSTEM ANALYSIS
V. T. CHOW, R. W. DRUCKER
/65- /

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NIL 133 FIELD 13G, 8C

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

WAVE FORCES ON BREAKWATERS
V. T. CHOW, W. J. GARCIA, J. P. MURTHA
/65- /

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NIL 134 FIELD 13F,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

DISTRIBUTION OF BOND STRESS AND STEEL FORCE IN REINFORCED CONCRETE BEAMS
C. P. SIESS, J. P. COLACO
/65- /
ILLINOIS, UNIVERSITY OF

NIL 135 FIELD 13F,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

MOMENT-ROTATION CHARACTERISTICS OF REINFORCED CONCRETE MEMBERS
C. P. SIESS, M. NAMES
/65- /

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NIL 139 FIELD 20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

MULTIPLE-PANEL REINFORCED CONCRETE FLOOR SLABS

M. A. SOZEN, W. L. GAMBLE, C. P. SIESS
/65- /

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NIL 143 FIELD 12A, 5C,13M,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

OPTIMUM DESIGN OF FRAMED STRUCTURES

S. J. FENVES, J. G. CROSE, W. J. HALL
/65- /

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NIL 144 FIELD 12A, 5C,13M,20L

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OPTIMUM DESIGN OF FRAMEWORKS

R. N. WRIGHT, W. J. HALL, R. A. RIDHA
/65- /

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NIL 146 FIELD 8K,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

DYNAMIC ANALYSIS OF MULTISTORY BUILDINGS

S. J. FENVES, D. N. BURGESS
/65- /

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NIL 147 FIELD 12A,13M,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS
INELASTIC BEHAVIOR OF MULTISTORY STEEL FRAMES
E. H. GAYLORD, E. W. WRIGHT
/65- /

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NIL 149 FIELD 13B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS
GEOLOGIC FACTORS IN ENGINEERING PROJECTS
R. B. PECK, J. V. BENAK
H. W. CHRYSSEFOPOULOS, D. U. DEERE
H. O. IRELAND, T. H. THORNBURN
/65- /
ILLINOIS, UNIVERSITY OF

NIL 152 FIELD 13B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS
THE BEARING CAPACITY AND SETTLEMENT CHARACTERISTICS OF FOOTINGS IN LOESS
D. U. DEERE, J. V. BENAK
/65- /
ILLINOIS, UNIVERSITY OF

NIL 159 FIELD 13F

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

A STRUCTURAL DESIGN CLASSIFICATION OF PAVEMENTS BASED ON AN ANALYSIS OF PAVEMENT BEHAVIOR, MATERIAL PROPERTIES AND MODES OF FAILURE
E. J. BARENBERG, E. DANNER
/65- /
ILLINOIS, UNIVERSITY OF

NIL 160 FIELD 13F,12A

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

OPTIMIZATION OF TRANSPORTATION SYSTEMS

W. W. HAY, R. W. DRUCKER
/65- /

ILLINOIS, UNIVERSITY OF

NIL 161 FIELD 13F,20L

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

WHEEL-RAIL CONTACT STRESSES - ROTATIVE AND LATERAL SLIP OF RAILWAY WHEELS ON RAILS

W. W. HAY, A. F. TALHA
/65- /

ILLINOIS, UNIVERSITY OF

NST 8 2 FIELD 13F,13b

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, CALIFORNIA

THE ECONOMICS OF DESIGN STANDARDS FOR LOW VOLUME RURAL ROADS

C. H. OGLESBY, V. J. ROGGEVEEN
6/65- 6/66

STANFORD UNIVERSITY

YAR 48 FIELD 13B, 8H

UNIVERSITY OF ARIZONA, AGRICULTURAL EXPT STA, WATERSHED MANAGEMENT, ARIZONA

CONSERVATION OF A BLENDED INDUSTRIAL WASTE EFFLUENT USING ARTIFICIAL GROUND WATER RECHARGE PROCEDURES

L. G. WILSON, C. B. CLUFF, M. M. FOGEL
/65- /

STATE-ARIZONA

YAR 49 FIELD 13B, 8H,12A

UNIVERSITY OF ARIZONA, AGRICULTURAL EXPT STA, AGRIC ENGINEERING, ARIZONA

GROUND WATER SUPPLIES

H. C. SCHWALEN, W. G. MATLOCK, R. J. SHAW
/65- /

STATE-ARIZONA

YCU 113 FIELD 13G

COLORADO STATE UNIV, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, COLORADO

MODEL STUDY OF BIFURCATION STILLING POOL AND PARSHALL FLUM ON HANSEN CANAL

S. KARAKI
6/65- 9/65

STATE-COLORADO

YDE 36 FIELD 13G,13B, 8H

STATE, GEOL SURV NEWAR, DELAWARE
FUTURE WATER SUPPLY FOR NEWARK, DELAWARE
/66- /
R. D. VARRIN
STATE-DELAWARE

YGA 281 FIELD 13F,11C,11F,12A

GEORGIA INST OF TECH, SCHOOL OF ENGINEERING, ENGIN EXPT STATION, GEORGIA

A STUDY OF HIGHWAY STRUCTURE CORROSION PROBLEMS AND METAL PROTECTIVE COATING SYSTEMS

W. R. TOOKE, W. H. BURROWS, L. ELSTON
D. HURST, W. ROSE, W. M. SLOAN
/66- /
STATE-GEORGIA

YIL 280 FIELD 13F

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

HIGHWAY PROBLEMS - ILLINOIS COOPERATIVE HIGHWAY RESEARCH PROGRAM

E. DANNER
/65- /

STATE-ILLINOIS

YIL 281 FIELD 13F

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

HIGHWAY PROBLEMS - ILLINOIS COOPERATIVE HIGHWAY RESEARCH PROGRAM SUPERVISION

E. DANNER
/65- /

STATE-ILLINOIS

YIL 285 FIELD 13B,13F

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

LIME STABILIZATION OF SOILS FOR HIGHWAY PURPOSES

M. R. THOMPSON, B. J. DEMPSEY
T. E. SWANSON
/65- /

STATE-ILLINOIS

YNY 595 FIELD 13B

CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, NEW YORK

CHARACTERISTICS OF WASTES FROM WATER FILTRATION PLANTS

C. O. GATES
6/65-10/65

STATE-NEW YORK

YNY 597 FIELD 8H

SYRACUSE UNIVERSITY, NEW YORK

ORIGIN AND NATURE OF POLLUTING OILS IN WATER

J. H. NAIR
6/65-12/65

STATE-NEW YORK

YOR 325 1

OREGON STATE UNIV, AGRICULTURAL EXPT STA, FOREST SCIENCE, OREGON

INVESTIGATION OF ACCEPTABILITY OF RESIDENTIAL FLOORS FROM STANDPOINT OF DEFLECTION AND VIBRATION CHARACTERISTICS

G. H. ATHERTON
OREG-0699
/66- /

STATE-OREGON

14. Methods and Equipment

GSP 1874 1 FIELD 7A, 9+

NORTHWESTERN UNIV, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

OPERATIONAL AMPLIFIER INSTRUMENTATION FOR HIGH ACCURACY AND HIGH SENSITIVITY A.C. POLAROGRAPHY

D. E. SMITH, D. D. DEFORD

NSF-GP-3484
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

NIL 55 FIELD 20D,10B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, ILLINOIS

HYPERVELOCITY WIND TUNNEL NOZZLE DESIGN AND CALIBRATION

J. L. LOTH
/65- /

ILLINOIS, UNIVERSITY OF

17. Navigation, Communications, Detection, and Countermeasures

PW 921 FIELD 17G, 3A

YALE UNIVERSITY, SCHOOL OF ENGINEERING, METALLURGY, CONNECTICUT

PRECISION CELESTIAL NAVIGATION

R. B. GORDON
9/64- 8/65
SOCIETY SIGMA XI + SC RES SOC AMER

18. Nuclear Science and Technology

NIL 25 FIELD 12A, 5A,18A

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, NUCLEAR ENGINEERING, ILLINOIS

A STUDY OF THE DYNAMIC BEHAVIOR OF A TRIGA REACTOR

M. E. WYMAN, J. BAUMGARTNER, K. HORNYIK
M. P. WYMAN

/65- /

ILLINOIS, UNIVERSITY OF

NIL 27 FIELD 18A,20H, 7B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, NUCLEAR ENGINEERING, ILLINOIS

REACTOR NEUTRON PULSE PROPAGATION

G. H. MILEY, G. P. BECK, K. Y. CHEUNG
P. K. DOSHI

/65- /

ILLINOIS, UNIVERSITY OF

NIL 30 FIELD 13B,11B,13H,18A

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, NUCLEAR ENGINEERING, ILLINOIS

MEASUREMENT OF DENSITY BY GAMMA RAY TRANSMISSION

K. PREISS, A. B. CHILTON, K. P. PREISS

/65- /

ILLINOIS, UNIVERSITY OF

PW 882 FIELD 5A,18A, 7D,20F

WESTERN RESERVE UNIV, GRADUATE SCHOOL, PHYSICS, OHIO

BETA-GAMMA ANGULAR CORRELATIONS FROM EXCITED NUCLEI USING HIGH RESOLUTION SOLID STATE DETECTORS

K. J. CASPER

9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

20. Physics

GPF 914 FIELD 5A,18A,20H

UNIV OF CAL-RIVERSIDE, GRADUATE SCHOOL, PHYSICS, CALIFORNIA

HIGH ENERGY PHYSICS

P. E. KAUS, P. NATH, M. D. SARKISSIAN
Y. N. SRIVASTAVA, R. ZACHARIASEN

AT-11-1-34-107-A
9/65- 8/66

AEC-DIVISION OF PHYSICAL RES

GPF 916 FIELD 5A,20H

US, AEC, BERKELEY, CALIFORNIA

HIGH ENERGY PHYSICS - EFFECT OF AN INELASTIC CHANNEL ON THE POSITION AND WIDTH OF A RESONANCE

M. D. SARKISSIAN, P. NATH

AT-11-1-34-107-A
9/65- 8/66

AEC-DIVISION OF PHYSICAL RES

GPF 917 FIELD 5A,20H

UNIV OF CAL-RIVERSIDE, GRADUATE SCHOOL, PHYSICS, CALIFORNIA

HIGH ENERGY PHYSICS - REGGE TRAJECTORIES VS. VANISHING RENORMALIZATION CONSTANTS AS DYNAMIC CRITERIA

P. E. KAUS, R. ZACHARIASEN

AT-11-1-34-107-A
9/65- 8/66

AEC-DIVISION OF PHYSICAL RES

GPF 924 FIELD 20J, 5A,18A,20H

TEXAS A + M UNIVERSITY, GRADUATE SCHOOL, PHYSICS, TEXAS

CYCLOTRON PRE-OPERATIONAL EXPERIMENTAL RESEARCH

C. F. SQUIRE, J. C. HIEBERT
J. A. MCINTYRE, M. L. ROUSH, E. E. VEZEY

AT(40-1)-3398
4/65- 9/66

AEC-DIVISION OF PHYSICAL RES

GSE 507 2 FIELD 14B,20D

NORTHWESTERN UNIV, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, ILLINOIS

MIXING OF DENSITY INHOMOGENEITIES IN TWO-PHASE SYSTEMS

S. G. BANKOFF

NSF-GP-2175
10/65-10/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 616 1 FIELD 7C, 7A,20M,20D

UNIVERSITY OF DELAWARE, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, DELAWARE

THERMAL CONDUCTIVITY OF DENSE GASES
E. W. COMINGS, J. L. NOVOTNY

NSF-GK-55
10/65-10/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 619 1 FIELD 20M,20D

UNIVERSITY OF ILLINOIS, GRADUATE SCHOOL, CHEMISTRY + CHEM ENGIN, ILLINOIS

TWO-PHASE FLOW

T. J. HANRATTY

NSF-GK-62
10/65-10/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 626 1 FIELD 20M,20D

UNIV OF NOTRE DAME, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, INDIANA

LAMINAR FREE CONVECTION AROUND HEATED BODIES

K. YANG, A. SZEWCZYK

NSF-GK-61
10/65-10/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 631 1 FIELD 7D,20J,20L

UNIVERSITY OF FLORIDA, SCHOOL OF ENGINEERING, NUCLEAR ENGINEERING, FLORIDA

NEUTRON WAVE PROPAGATION

R. E. UHRING, R. B. PEREZ

NSF-GK-60
10/65-10/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 662 FIELD 20I

UNIV OF CAL-LA JOLLA, SCHOOL OF ENGINEERING, AEROSPACE + MECH ENGIN, CALIFORNIA

TRANSPORT PROPERTIES OF PLASMAS

S. RAND

NSF-GK-561
8/65- 7/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 664 FIELD 9+,20F,20I

SYRACUSE UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, NEW YORK

RADIATION AND SCATTERING OF ELECTROMAGNETIC WAVES

D. K. CHENG

NSF-GK-643
11/65-10/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 671 FIELD 9+,20J,20C,20F

UNIV OF MINNESOTA, GRADUATE SCHOOL, ELECTRICAL ENGINEERING, MINNESOTA

NOISE IN GAS DISCHARGE PROBES AND GAS DISCHARGE LASERS

A. VANDERZIEL

NSF-GK-622
10/65- 9/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 686 FIELD 20C, 5A,20I,20L

MASS INST OF TECHNOL, GRADUATE SCHOOL, PHYSICS, MASSACHUSETTS

PLASMA AND CONTROLLED FUSION

S. C. BROWN, H. J. ZIMMERMANN

NSF-GK-614
10/65- 9/66

NSF-ENGINEERING SCIENCES DIVISION

GSP 41 4 FIELD 20C, 5A,20L

UNIV OF CAL-RIVERSIDE, GRADUATE SCHOOL, PHYSICS, CALIFORNIA

FERMI SURFACES AND ENERGY BANDS IN SOLIDS

A. W. LAWSON, G. E. EVERETT
K. K. KANAZAWA

NSF-GP-3558
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 115 4 FIELD 20M,20J

NEW YORK UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NEW YORK

ELEMENTARY PARTICLE THEORY

B. ZUMINO, J. BERNSTEIN, G. FRYE
M. A. RUDERMAN, A. SIRLIN

NSF-GP-2616
7/65- 2/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 882 3 FIELD 20M,11F,11G,20C

RUTGERS THE STATE UNIV, GRADUATE SCHOOL, PHYSICS, NEW JERSEY

LOW TEMPERATURE PROPERTIES OF SOLIDS

B. SERIN, P. LINDENFELD, E. A. LYNTON
W. L. MCLEAN

NSF-GP-3614
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 890 3 FIELD 5A,18A,20H

UNIV OF WASHINGTON, GRADUATE SCHOOL, PHYSICS, WASHINGTON

ELEMENTARY PARTICLE PHYSICS USING HIGH ENERGY ACCELERATORS

R. W. WILLIAMS, H. F. DAVIS, G. E. MASEK

NSF-GP-2251
10/64-10/65

NSF-PHYSICAL SCIENCES DIVISION

GSP 1626 2 FIELD 20M,11F,20C, 5A

UNIV OF CAL-RIVERSIDE, GRADUATE SCHOOL, PHYSICS, CALIFORNIA

NUCLEAR RESONANCE IN METALS

R. R. HEWITT

NSF-GP-3532
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1811 1 FIELD 7A, 7D,20J,20C

ILLINOIS INST OF TECH, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

PARAMAGNETIC RESONANCE IN METAMAGNETIC SUBSTANCES

C. TRAPP
NSF-GP-3498
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1840 1 FIELD 20M,11F,11G,20C

UNIV OF ROCHESTER, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, NEW YORK

PARAMAGNETIC METALS AT LOW TEMPERATURES

R. D. PARKS

NSF-GP-3516
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1854 1 FIELD 20C, 5A,20F,20L

UNIVERSITY OF DELAWARE, GRADUATE SCHOOL, PHYSICS, DELAWARE

LOW ENERGY SPUTTERING OF SOLIDS

C. B. COOPER, J. K. WOODYARD

NSF-GP-3530
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1857 1 FIELD 20J, 7B

UNIV OF WASHINGTON, GRADUATE SCHOOL, CHEMISTRY, WASHINGTON

QUANTUM MECHANICAL STUDY OF SIMPLE ATOMS AND MOLECULES

E. R. DAVIDSON

NSF-GP-3542
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1862 1 FIELD 7C,20J

UNIVERSITY OF IOWA, GRADUATE SCHOOL, CHEMISTRY, IOWA

CRYSTAL STRUCTURES OF CARBONIUM COMPOUNDS

N. C. BAENIZIGER

NSF-GP-3523
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1901 1 FIELD 20J,20C, 5A, 7B

STATE UNIV N Y BUFFALO, GRADUATE SCHOOL, PHYSICS, NEW YORK

FORBIDDEN LINES OF A MIXED TYPE

S. MROZOWSKI

NSF-GP-3598
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1903 1 FIELD 5A,20J

PURDUE UNIVERSITY, GRADUATE SCHOOL, PHYSICS, INDIANA

THEORY OF FIELD AND MATTER

F. J. BELINFANTE

NSF-GP-3650
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1909 1 FIELD 5A,20L,20J

BROWN UNIVERSITY, GRADUATE SCHOOL, PHYSICS, RHODE ISLAND

SUPERCONDUCTIVITY AND THE MANY BODY PROBLEM

L. N. COOPER

NSF-GP-3682
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1911 1 FIELD 20C, 5A,20L,20J

KANSAS ST UNIV AGR SCI, GRADUATE SCHOOL, PHYSICS, KANSAS

QUANTUM THEORY OF DISORDERED ALLOYS

G. L. HALL

NSF-GP-3626
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1916 1 FIELD 5A,20I,20J

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, PHYSICS, CALIFORNIA

THEORETICAL PHYSICS

H. W. LEWIS
NSF-GP-3599
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1918 1 FIELD 20J,20D, 5A,20A

CATHOLIC UNIV OF AMER, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, DIST OF COLUMBIA

STRUCTURAL RELAXATION IN LIQUIDS

R. MEISTER, T. A. LITOVITZ
G. E. MCDUFFIE

NSF-GP-3612
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1922 1 FIELD 20C, 5A,20L,20A

WASHINGTON UNIVERSITY, GRADUATE SCHOOL, PHYSICS, MISSOURI

NUCLEAR SPIN-PHONON INTERACTIONS IN SOLIDS

G. E. PAKE
NSF-GP-3596
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1925 1 FIELD 20D, 5A,20L, 7B

OHIO STATE UNIVERSITY, GRADUATE SCHOOL, PHYSICS, OHIO

MICROSCOPIC STRUCTURE OF LIQUIDS AND SOLIDS

C. H. SHAW

NSF-GP-3572
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1928 1 FIELD 5A,18A

PURDUE UNIVERSITY, GRADUATE SCHOOL, PHYSICS, INDIANA

ELEMENTARY PARTICLE THEORY

M. SUGAWARA

NSF-GP-3627
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1929 1 FIELD 20M,20J,20D, 5A

RUTGERS THE STATE UNIV, GRADUATE SCHOOL, PHYSICS, NEW JERSEY

NUCLEAR MAGNETIC RESONANCE IN SOLIDS, LIQUIDS AND GASES

H. C. TORREY, H. Y. CARR

NSF-GP-3610
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1930 1 FIELD 20C, 5A,20L

UNIV OF WASHINGTON, GRADUATE SCHOOL, PHYSICS, WASHINGTON

MAGNETIC RELAXATION IN CRYSTALS

E. A. UEHLING

NSF-GP-3681
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1935 1 FIELD 20M,20J,20D, 5A

UNIVERSITY OF COLORADO, GRADUATE SCHOOL, PHYSICS, COLORADO

QUANTUM STATISTICAL MECHANICS

F. MOHLING

NSF-GP-3625
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1936 1 FIELD 5A,18A, 7B

UNIV OF CONNECTICUT, GRADUATE SCHOOL, PHYSICS, CONNECTICUT

ELEMENTARY PARTICLE THEORY

K. HALLER

NSF-GP-3622
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1937 1 FIELD 5A,18A,20J

NORTHEASTERN UNIV, UNDERGRADUATE SCHOOL, PHYSICS, MASSACHUSETTS

PARTICLE AND FIELD THEORY

R. L. ARNOWITT

NSF-GP-3615
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1938 1 FIELD 20J,20C, 5A,20L

TUFTS UNIVERSITY, GRADUATE SCHOOL, PHYSICS, MASSACHUSETTS

THEORY OF SOLIDS

L. M. ROTH

NSF-GP-3636
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1949 1 FIELD 12A,20H, 5A,20J

STATE UNIV N Y BINGHAM, UNDERGRADUATE SCHOOL, SCIENCE + MATHEMATICS, NEW YORK

EXACT SOLUTION OF THE INHOMOGENEOUS FIELD EQUATIONS

R. PENFIELD

NSF-GP-3719
11/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1970 1 FIELD 5A,18A,20J

RUTGERS THE STATE UNIV, GRADUATE SCHOOL, PHYSICS, NEW JERSEY

THEORETICAL PHYSICS

S. BARSHAY, R. ROCKMORE

NSF-GP-3700
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 1995 1 FIELD 5A,20L,20J

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, PHYSICS, ILLINOIS

THE ELECTRON THEORY OF SOLIDS

M. H. COHEN, L. M. FALICOV
J. C. PHILLIPS

NSF-GP-3613
10/65-10/66

NSF-PHYSICAL SCIENCES DIVISION

210-195 O - 66 - C

GUE 117 1 FIELD 20J,20D

UNIV OF HOUSTON, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, TEXAS

THE FUNDAMENTAL NATURE OF LIQUIDS

H. W. PRENGLE

SW-14-01-0001-512
12/65-11/66

INTERIOR-OFFICE OF SALINE WATER

GUW 76 FIELD 13G,20D

SOUTH DAKOTA ST UNIV, SCHOOL OF ENGINEERING, WATER RESOURCES, SOUTH DAKOTA

APPARENT VISCOSITY OF FINE MATERIAL CONCENTRATION AS IT AFFECTS SEDIMENT TRANSPORT AND VELOCITIES IN OPEN CHANNEL FLOW

G. R. ALGER, G. *. ALGER, B. ENO

INT-WR-A-007-SDAK
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 103 FIELD 20D

CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, HYDRAUL + HYDRAUL ENG, NEW YORK

INVESTIGATION OF TWO-PHASE - LIQUID-SOLID - PROBLEMS

A. H. GRAF, E. R. ACAROGLU

INT-WR-A-006-NY
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

NIL 4 FIELD 20M,20D

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS

UNSTEADY HEAT TRANSFER IN LAMINAR FLOWS

B. T. CHAO, D. R. JENG
/65- /
ILLINOIS, UNIVERSITY OF

NIL 7 FIELD 7D,20M,20D

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS

SURFACE BUILING STUDIES

R. F. LARSON
/65- /

ILLINOIS, UNIVERSITY OF

NIL 11 FIELD 12A,13M,20M,20D

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS

DYNAMICS OF MULTI-PHASE SYSTEMS

S. L. SOO, T. L. TUNG
/65- /
ILLINOIS, UNIVERSITY OF

NIL 24 FIELD 20J, 5A,18A, 7D

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, NUCLEAR ENGINEERING, ILLINOIS

DIVISION OF NUCLEAR CHARGE BETWEEN PRIMARY FISSION FRAGMENTS OF THERMALLY FISSIONED U 235

M. E. WYMAN, B. W. WEHRING, M. *. WYMAN
/65- /

ILLINOIS, UNIVERSITY OF

NIL 26 FIELD 5A,18A, 7D, 7B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, NUCLEAR ENGINEERING, ILLINOIS

TIME DELAYS OF NUCLEAR TRANSITIONS BELOW 200 KEV IN FISSION FRAGMENT FROM U-235

M. E. WYMAN, L. B. BRIDWELL, M. *. WYMAN
/65- /

ILLINOIS, UNIVERSITY OF

NIL 29 FIELD 20M,18A

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, NUCLEAR ENGINEERING, ILLINOIS

SHORT INTERVAL REPETITIVE PULSE OPERATION OF A TRIGA REACTOR

G. H. MILEY, G. P. BECK, H. KURSTEDT
/65- /

ILLINOIS, UNIVERSITY OF

NIL 31 FIELD 12A,20M, 7D,20F

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, NUCLEAR ENGINEERING, ILLINOIS

PRELIMINARY INVESTIGATION INTO A NEW APPROACH FOR MONTE CARLO CALCULATIONS OF GAMMA RAY TRANSPORT

A. B. CHILTON, A. *. CHILTON
/65- /

ILLINOIS, UNIVERSITY OF

NIL 42 FIELD 20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, ILLINOIS

MULTIAXIAL FAILURE CRITERIA OF VISCOELASTIC MATERIALS

A. R. ZAK
/65- /

ILLINOIS, UNIVERSITY OF

NIL 58 FIELD 20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, ILLINOIS

NONSTATIONARY RANDOM PROCESSES IN STRUCTURAL DYNAMICS

Y. K. LIN
/65- /

ILLINOIS, UNIVERSITY OF

NIL 65 FIELD 20D,20I

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, ILLINOIS

IONIZING WAVES

C. E. BOND
/65- /

ILLINOIS, UNIVERSITY OF

NIL 66 FIELD 20D,20A

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, ILLINOIS

ACOUSTIC WAVES IN STEADY, ONE-DIMENSIONAL NON-UNIFORM FLOW

H. O. BARTHEL, R. A. STREHLOW

/65- /

ILLINOIS, UNIVERSITY OF

NIL 69 FIELD 20D,10B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, ILLINOIS

METHOD OF CHARACTERISTICS IN THREE-DIMENSIONAL STEADY AND NONSTEADY FLOW

A. I. ORMSBEE, C. R. STROM
/65- /

ILLINOIS, UNIVERSITY OF

NIL 92 FIELD 12A,13M,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, ILLINOIS

PARAMETRIC RESONANCE OF A VISCOELASTIC COLUMN

K. K. STEVENS, R. E. MILLER
/65- /

ILLINOIS, UNIVERSITY OF

NIL 93 FIELD 12A,13M,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, ILLINOIS

A MORE EXACT THEORY OF FLEXURAL WAVE PROPAGATION IN ELASTIC BEAMS

F. H. BRITTAIN, R. E. MILLER
/65- /

ILLINOIS, UNIVERSITY OF

NIL 94 FIELD 12A,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, ILLINOIS

VIBRATIONS OF VARYING CROSS-SECTION BEAMS WITH INTERNAL DAMPING

H. WANG, W. J. WORLEY
/65- /

ILLINOIS, UNIVERSITY OF

NIL 95 FIELD 20D

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, ILLINOIS

A STUDY OF HOMOLOGOUS TURBULENCE

J. M. ROBERTSON, H. F. JOHNSON
/65- /

ILLINOIS, UNIVERSITY OF

NIL 96 FIELD 12A,13M,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, ILLINOIS

PARTICULAR THEORETICAL AND EXPERIMENTAL PHOTOELASTIC STRESS SOLUTIONS OF DOUBLY CONNECTED CIRCULAR TORSION BARS OF VARYING DIAMETER

W. F. SWINSON, C. E. BOWMAN
/65- /

ILLINOIS, UNIVERSITY OF

NIL 97 FIELD 20D

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, ILLINOIS

TURBULENT BOUNDARY-LAYER FLOW TOWARDS A NORMAL STEP

J. M. ROBERTSON, H. F. JOHNSON
/65- /

ILLINOIS, UNIVERSITY OF

NIL 99 FIELD 11G,12A,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, ILLINOIS

CREEP ANALYSIS OF STATICALLY INDETERMINATE PORTAL FRAMES

S. SOSRODININGRAT, D. SIDEBOTTOM
/65- /

ILLINOIS, UNIVERSITY OF

NIL 100 FIELD 12A,20D

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, ILLINOIS

TURBULENT BOUNDARY LAYERS IN ADVERSE PRESSURE GRADIENTS

J. M. ROBERTSON
/65- /

ILLINOIS, UNIVERSITY OF

NIL 101 FIELD 20D,10B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, ILLINOIS

TURBULENT WAKES NEAR BODIES

J. M. ROBERTSON
/65- /

ILLINOIS, UNIVERSITY OF

NIL 102 FIELD 20D

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, ILLINOIS

VELOCITY DISTRIBUTION IN AN OPEN CHANNEL HAVING A TRIANGULAR CROSS-SECTION

W. M. LANSFORD
/65- /

ILLINOIS, UNIVERSITY OF

NIL 107 FIELD 11G,20L

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, ILLINOIS

CYCLE-DEPENDENT DEFORMATION AND FRACTURE

J. MORROW, G. R. HALFORD, B. I. SANDOR
/65- /

ILLINOIS, UNIVERSITY OF

NIL 109 FIELD 12A,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, ILLINOIS

THE BUCKLING OF AN INITIALLY STRAIGHT CYLINDER SUBJECT TO BENDING AND LATERAL PRESSURE

P. JANZEN, R. E. MILLER
/65- /

ILLINOIS, UNIVERSITY OF

NIL 116 FIELD 20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

ANALYSIS OF CYLINDRICAL SHELLS CONTAINING OPENINGS WITH STIFFENED EDGES

W. C. SCHNOBRICH, R. E. PINCKERT

/65- /

ILLINOIS, UNIVERSITY OF

NIL 117 FIELD 12A,13M,14B,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

ELASTIC BUCKLING OF TOROIDAL SHELLS

W. C. SCHNOBRICH, J. S. ENDICOTT
/65- /

ILLINOIS, UNIVERSITY OF

NIL 118 FIELD 20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

LATERAL BUCKLING OF EXPANDED BEAMS WITH WEB-OPENINGS

J. E. STALLMEYER, F. A. MORSY
/65- /

ILLINOIS, UNIVERSITY OF

NIL 119 FIELD 11F,13M,11G

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

FATIGUE DATA SUMMARY

W. H. MUNSE
/65- /

ILLINOIS, UNIVERSITY OF

NIL 120 FIELD 20L

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

EVALUATION OF LOCAL PLASTIC STRAIN HISTORY IN FATIGUE

W. H. MUNSE, H. A. OSMAN

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ILLINOIS, UNIVERSITY OF

NIL 131 FIELD 20D

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

FLOW IN A TWO-DIMENSIONAL 90 DEGREE CLOSED BEND

M. B. MCPHERSON, W. H. HUANG
J. M. ROBERTSON

/65- /

ILLINOIS, UNIVERSITY OF

NIL 137 FIELD 13F,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

ANALYSIS OF SKEWED ANISOTROPIC PLATES

R. N. WRIGHT, W. C. GUSTAFSON
A. R. ROBINSON

/65- /

ILLINOIS, UNIVERSITY OF

NIL 140 FIELD 20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

ANALYSIS OF PLATES WITH IRREGULAR COLUMN ARRANGEMENTS

C. P. SIESS, D. D. MOSS

/65- /

ILLINOIS, UNIVERSITY OF

NIL 145 FIELD 20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

CRITICAL LOADS OF ELASTO-PLASTIC SPACE FRAME

E. H. GAYLORD, W. MCVINNIE

/65- /

ILLINOIS, UNIVERSITY OF

NIL 148 FIELD 12A,13M,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

INELASTIC LATERAL TORSIONAL BUCKLING OF BEAM-COLUMNS

E. H. GAYLORD, C. R. NOWACKI

/65- /

ILLINOIS, UNIVERSITY OF

PW 920 FIELD 20C,20D

UNIV OF LUCKNOW, INDIA

STUDY OF THE SOLUTIONS OF HIGH DIELECTRIC CONSTANT

R. GOPAL

9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 996 FIELD 9+

CONTINUATION AND COMPLETION OF THE PROBLEM, IMPEDANCE VS. FREQUENCY CHARACTERISTICS OF A D-C PLASMA

A. D. PLOUARIKAS

9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

PW 1044 FIELD 9D,20H,20J

SOUTHERN ILLINOIS UNIV, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

A DESCRIPTIVE CODING SYSTEM FOR INFRARED SPECTRA

R. E. VANATTA

9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

ZDA 711 FIELD 9+

USDC, NATL BUR STAN, BOULDER, COLORADO

RADAR PROPAGATION

H. T. DOUGHERTY

NBS-8370-12-83476
/64- /

COMMERCE-NATIONAL BUREAU OF STANDARDS

ZNE 60 FIELD 18A

USN, BUR NAV PERSON, MONTEREY, CALIFORNIA

ELECTRON LINEAR ACCELERATOR

F. A. BUMILLER

NR-024-518
7/64- 6/65

NAVY-OFFICE NAVAL RESEARCH

ZNE 63 2 FIELD 20F

USN, NAV ACADEMY, ANNAPOLIS, MARYLAND

RADITION AND OPTICS

J. H. SMITHSON

NR-015-904
1/65-12/65

NAVY-OFFICE NAVAL RESEARCH

ZNE 64 FIELD 20D

USN, BUR NAV WEAP, CHINA LAKE, CALIFORNIA

NON-NEWTONIAN ADDITIVES

W. E. HICKS

NR-062-329
8/64- 7/65

NAVY-OFFICE NAVAL RESEARCH

ZPF 390 1 FIELD 11F,13H,11G

US, AEC, BERKELEY, CALIFORNIA

RELATIONSHIP BETWEEN STRUCTURE AND PROPERTIES OF CRYSTALLINE MATERIALS

G. THOMAS

/65- /

AEC-DIVISION OF PHYSICAL RESEARCH

ZPF 391 1 FIELD 11F,11G,20L

US, AEC, BERKELEY, CALIFORNIA

CRYSTAL IMPERFECTIONS

J. WASHBURN

/65- /

AEC-DIVISION OF PHYSICAL RESEARCH

ZPF 394 1 FIELD 7A, 7D,11B,11G

US, AEC, BERKELEY, CALIFORNIA

MECHANICAL BEHAVIOR OF MICROSTRUCTURES, SOLID STATE REACTIONS AND GLASS METAL INTERFACES

J. A. PASK

/65- /

AEC-DIVISION OF PHYSICAL RESEARCH

ZPF 440 1 FIELD 20M,20J, 7B

US, AEC, BERKELEY, CALIFORNIA

THERMODYNAMIC COMPILATIONS

L. BREWER, N. LOFGREN, G. ROSENBLATT

/65- /

AEC-DIVISION OF PHYSICAL RESEARCH

ZPF 470 1 FIELD 7D,20M,11B,11F

US, AEC, BERKELEY, CALIFORNIA

THERMODYNAMICS OF THE METALLIC STATE

R. R. HULTGREN, K. K. KELLEY
W. L. WORRELL

/65- /

AEC-DIVISION OF PHYSICAL RESEARCH

ZPF 655 FIELD 7A,20M,12A

US, AEC, BERKELEY, CALIFORNIA

EQUATION OF STATE

O. REDLICH

/65- /

AEC-DIVISION OF PHYSICAL RESEARCH

ZPF 663 FIELD 11F,11G

US, AEC, BERKELEY, CALIFORNIA

RATE CONTROLLING DEFORMATION MECHANISM

J. E. DORN, W. FERGUSEN, F. HAUSER
Y. ISHIDA, A. MUKHERJEE

/65- /

AEC-DIVISION OF PHYSICAL RESEARCH

ZPF 667 FIELD 20M,20C,20D,20L

US, AEC, BERKELEY, CALIFORNIA

HIGH PRESSURES

G. JURA

/65- /

AEC-DIVISION OF PHYSICAL RESEARCH

ZPF 669 FIELD 7D,20J

US, AEC, BERKELEY, CALIFORNIA

ELECTRON IMPACT STUDIES

B. H. MAHAN, M. SUTCLIFFE

/65- /

AEC-DIVISION OF PHYSICAL RESEARCH

ZPF 671 FIELD 7C, 7D,20J,20C

US, AEC, BERKELEY, CALIFORNIA

COMPOSITION OF IONIZED GASES BY MASS SPECTROMETRY

B. H. MAHAN

/65- /

AEC-DIVISION OF PHYSICAL RESEARCH

ZPF 672 FIELD 7D,20M,20F,20L

US, AEC, BERKELEY, CALIFORNIA

SOLID-FLUID PHASE BOUNDARIES

R. H. MULLER

/65- /

AEC-DIVISION OF PHYSICAL RESEARCH

ZPF 673 FIELD 20M,11G,20C,20L

US, AEC, BERKELEY, CALIFORNIA

LOW TEMPERATURE PROPERTIES OF MATERIALS

N. E. PHILLIPS, L. FINEGOLD

/65- /

AEC-DIVISION OF PHYSICAL RESEARCH

ZUG 359 1 FIELD 7C,21D, 7A,20M

USDI, BUR MINES, PITTSBURGH, PENNSYLVANIA

REACTIONS OF COAL IN HIGH-TEMPERATURE PLASMAS

R. W. HITESHUE, R. D. GRAVES, W. KAWA
J. E. ZEILINGER

INT-BM-4185-19
/65- /

INTERIOR-BUREAU OF MINES

21. Propulsion and Fuels

7GX 1861 1 FIELD 13A,13B, 7D,21B

UNIV OF CAL-BERKELEY, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, CALIFORNIA

COMBUSTION GAS COMPOSITION

E. S. STARKMAN, P. B. STEWART

7-AP-00385-01
8/65- 7/66

PHS-BSS

YIL 15 FIELD 7C,21B,21D,20M

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS

INVESTIGATION OF MECHANISM OF SURFACE IGNITION IN INTERNAL COMBUSTION ENGINES

W. L. HULL, J. O. BECKER

/65- /

ILLINOIS, UNIVERSITY OF

YIL 244 1 FIELD 7D,21B,21D, 8D

STATE, GEOL SURV URBNA, ILLINOIS

PETROGRAPHIC AND REFLECTANCE STUDIES OF COAL

J. A. HARRISON

/65- /

STATE-ILLINOIS

YIL 252 1 FIELD 7D,20M, 8D, 8G

STATE, GEOL SURV URBNA, ILLINOIS

RAPID METHODS FOR COAL ANALYSIS

O. W. REES, C. W. BEELER, J. K. KUHN
W. F. SHIMP

/65- /

STATE-ILLINOIS

TECHNICAL ABSTRACT BULLETIN

Field 1-AERONAUTICS

1/1. AERODYNAMICS

AD-627 898 Fld. 1/1, 1/3, 20/4
AIR FORCE SYSTEMS COMMAND WASHINGTON D C
AN EMPIRICAL METHOD FOR CALCULATING THE POWER REQUIRED DUE TO COMPRESSIBILITY ON A SINGLE ROTOR HELICOPTER,
by David C. Norman, and Dennis J. Sultany. Jul 65, 9p. Proj. 443Q

Unclassified report

Availability: Published in Journal of American Helicopter Society v10 n3 p30-6 Jul 1965. Copies to DDC users only.

Descriptors: (*Helicopters, Aerodynamics), (*Aerodynamics, Helicopters), Aerodynamic loading, Helicopter engines, Power, Throttling, Performance (Engineering), Flight testing, Mathematical models

A flight test program was conducted to verify an empirical method developed for calculating the power required due to compressibility on the UH-1F helicopter. The increase in power required due to compressibility determined by the method was found to be a function of the difference between the advancing blade tip Mach number and the critical Mach number for the airfoil section. The method used an empirical factor to determine the critical Mach number instead of a theoretical computation of the drag divergence Mach number as used in previous methods. The power required was determined by flight test over the operating range of rotor rpm, tip Mach number, thrust coefficient, tip speed ratio, altitude, and gross weight. Based on comparison to the test results, the maximum difference in power required between that predicted by the method and that obtained during flight test was 3% for all level flight speeds above the speed for minimum power required. At speeds below the speed for minimum power required, the maximum difference varied from 2% to 9%. For the conditions flight tested, the empirical method shows that less power is required due to compressibility than previous methods indicated. However, application of the method to other helicopters remains to be proven through further flight testing. (Author)

AD-627 989 Fld. 1/1, 1/2
CFSTI Prices: HC $3.00 MF $0.75
SYSTEMS TECHNOLOGY INC HAWTHORNE CALIF
A STUDY OF CONVENTIONAL AIRPLANE HANDLING QUALITIES REQUIREMENTS. PART II. LATERAL-DIRECTIONAL OSCILLATORY HANDLING QUALITIES.
Technical rept.,
by I. L. Ashkenas. Nov 65, 74p. Contract AF33 (657)-10407 Proj. AF-8219 Task 821905
AFFDL TR-65-138-Pt-2

Unclassified report

Descriptors: (*Airplanes, Aerodynamic characteristics), (*Aerodynamics, Man-machine systems), (*Man-machine systems, Airplanes), (*Human engineering, Aeronautics), Pilots, Flight testing, Standards

This report is a codification in two parts of conventional aircraft handling qualities criteria. The results of this effort are to serve as an intermediate design guide in the areas of lateral-directional oscillatory and roll control. The roll handling qualities portion of this report uses as a point of departure the concept that control of bank angle is the primary piloting task in maintaining or changing heading. In the lateral oscillatory portion of this effort, in defining requirements for satisfactory Dutch roll characteristics, a fundamental consideration is the fact that the motions characterizing this mode are ordinarily not the pilot's chief objective. That is, he is not deliberately inducing Dutch roll motions in the sense that he induces rolling and longitudinal short-period motions. A worthwhile approach to establishment of Dutch roll damping requirements is to first establish the basic level, and then to study the varied influences of the disturbance parameters. This approach provides the basis for the material contained in this report.

1/2. AERONAUTICS

AD-627 294 Fld. 1/2
CFSTI Prices: HC $2.00 MF $0.50
SYSTEMS ENGINEERING GROUP RESEARCH AND TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
TECHNIQUES FOR CALCULATING THE ABILITY OF AN AIRCRAFT TO CORRECT FOR COMBINATIONS OF LATERAL OFFSETS AND HEADING ERRORS.
Rept. for 25 Apr-10 Jun 65,
by John M. Griffin. Oct 65, 35p. Rept. no. SEG-TR-65-54

Unclassified report

Descriptors: (*Aircraft, Maneuverability), Flight control systems, Errors, Corrections, Landings, Stability, Runways, Mathematical analysis

Three analytical methods are derived for calculating lateral distance and heading error combinations that an aircraft can correct with lateral control inputs. The techniques for calculating the maximum correctable errors are based on lateral-directional dynamics with a static, geometric analysis to assure compliance with an aircraft's longitudinal maneuvering capabilities. The analyses are developed using the power approach configuration as an illustration to present the derivation and to show how aircraft maneuverability and pilot operating limits dictate the problem boundaries. Computer techniques are emphasized as the means for the mathematical solutions. (Author)

AD-627 370 Fld. 1/2
CFSTI Prices: HC $6.00 MF $1.25
PRINCETON UNIV N J DEPT OF AEROSPACE AND MECHANICAL SCIENCES
AN ANALYTICAL STUDY OF THE DYNAMICS OF AIRCRAFT IN UNSTEADY FLIGHT,
by H. C. Curtiss,Jr.. Oct 65, 234p. Rept. no. Aerospace/Mechanical Sci-709
Contract DA-44-177-AMC-8 (T) Task 1D121401A14203
USAAVLABS TR-65-48

Unclassified report

Descriptors: (*Aircraft, Aerodynamics), (*Vertical take-off planes, Aerodynamics), Flight, Differential equations, Dynamics, Stability

The dynamic response of conventional and VTOL aircraft with varying flight velocity is investigated. It is assumed that the dynamic motions of aircraft may be described by linear differential equations whose coefficients (stability derivatives) are functions of flight velocity, and therefore vary with time. Primary emphasis is placed on the evaluation of the general nature of the vehicle response and its departure from frozen system (constant coefficients) characteristics.

AD-627 372 Fld. 1/2
CFSTI Prices: HC $3.00 MF $0.75
LOCKHEED-CALIFORNIA CO BURBANK
EXTENSION OF THE HIGH-SPEED FLIGHT ENVELOPE OF THE XH-51A COMPOUND HELICOPTER)
Final rept.,
by Donald R. Wyrick. Nov 65, 72p. Rept. no. LR-18917
Contract DA-44-177-AMC-150 (T) Task 1P121401A14311
USAAVLABS TR-65-71

Unclassified report

Descriptors: (*Helicopters, Flight testing), Maneuverability, Vibration, Performance (Engineering), Loading (Mechanics), Helicopter rotors

The report presents the results of a speed extension program on the compound version of the rigid-rotor XH-51A helicopter. The principle objective of the program was to investigate the flight characteristics of the compound helicopter with special emphasis on the areas of flying qualities, performance, structural loads, vibration, and maneuverability in the speed range of 200 to 230 knots true airspeed. All contract objectives were met or exceeded. The maximum level flight true airspeeds demonstrated, during this program, were 236 knots at sea level and 228 knots at a density altitude of 12,000 feet. (Author)

AD-627 377 Fld. 1/2, 8/13
CFSTI Prices: HC $2.00 MF $0.50
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS
TESTS WITH THE CH-47A CHINOOK HELICOPTER IN SOFT CLAY SOILS.
Final rept.,
by E. S. Rush. Jan 66, 41p. Rept. no. MP-4-766 Proj. 1-V-0-21701-A-046 Task 1-V-0-21701-A-046-02

Unclassified report

Descriptors: (*Helicopters, Landing fields), (*Landing fields, Helicopters), (*Soil mechanics, Trafficability), Soils, Loading (Mechanics), Aircraft landings, Test facilities, Mississippi, Maryland

The primary purpose of the test program reported herein was to determine quantitatively the performance of the CH-47A Chinook helicopter in soft soils. Tests were conducted at three different locations on a range of soil strengths and at three different payloads. A total of 15 landings were made on 27 and 28 May 1965 near Vicksburg, Miss. Subsequent tests were conducted at Aberdeen Proving Ground, Md., from 21 to 24 June 1965. The Aberdeen Proving Ground tests are discussed briefly in Appendix A. It was concluded that (a) the Chinook has adequate power for lift-off from most soft soil conditions, (b) a relation exists between sinkage of landing gear assembly into a soil and the ratio of bearing pressure to cone index, and (c) the presently designed cargo ramp will allow a cargo space entrance height of 72 in. only when the helicopter landing gear sinkage is about 12 in. or less. (Author)

AD-627 659 Fld. 1/2, 1/3
CFSTI Prices: HC $3.00 MF $0.75
SYSTEMS TECHNOLOGY INC HAWTHORNE CALIF
A STUDY OF CONVENTIONAL AIRPLANE HANDLING QUALITIES REQUIREMENTS. PART I. ROLL HANDLING QUALITIES.
Final rept. Jan 63-May 65,
by I. L. Ashkenas. Nov 65, 82p. Rept. no. STI-TR-133-2-Pt-1
Contract AF33 (657)-10407 Proj. AF-8219 Task 821905
AFFDL TR-65-138-Pt-1

Unclassified report

Descriptors: (*Aircraft, Handling), (*Roll, Aircraft), Control systems, Military requirements, Damping

The report uses as a point of departure the concept that control of bank angle is the primary piloting task in maintaining or changing heading. Regulation of the bank angle to maintain heading is a close-loop tracking task in which the pilot applies aileron control as a function of observed bank angle error. For large heading changes, the steady-state bank angle consistent with available or desired load factor is attained in an open-loop fashion; it is then regulated in a closed-loop fashion throughout the remainder of the turn. For the transient entry and exit from the turn, the pilot is not concerned with bank angle per se, but rather with attaining a mentally commanded bank angle with tolerable accuracy in a reasonable time, and with an easily learned and comfortable program of aileron movements.

AD-627 989 **See Fld. 1/1**

1/3. AIRCRAFT

AD-627 361 Fld. 1/3
CFSTI Prices: HC $5.00 MF $1.25
HUGHES TOOL CO CULVER CITY CALIF AIRCRAFT DIV
COMPONENT TESTING XV-9A HOT CYCLE RESEARCH AIRCRAFT.
Summary rept. 29 Sep 62-15 Mar 65,
by G. D. Deveaux. Nov 65, 199p. Rept. no. HTC-AD-64-26 (385-T-16)
Contract DA-44-177-AMC-877 (T) Task 1M121401D14403
USAAVLABS TR-65-38

Unclassified report

See also AD-621 684.

Descriptors: (*Vertical take-off planes, Rotor blades (Rotary wings)), (*Rotor blades (Rotary wings), Tests), Jet helicopter rotors, Fatigue (Mechanics), Rotary wings, Frequency, Joints, Research planes

The component tests included fatigue tests of the blade root-end and constant section areas, hub gimbal system, spar-to-segment and root-fitting-to-spar attachments, and material evaluation tests of the blade spars. Sealing tests were conducted on the joint between the Y-duct and triduct in the hub area, the joint area between the gas generator and diverter valve, and the fixed-duct joint on the rotor blade. Blade natural frequency tests were conducted to ensure that the natural frequencies of the rotor blade would not be in a critical frequency range. The instrumented flight blade was calibrated in a test fixture before the flight test program. (Author)

AD-627 369 Fld. 1/3, 21/5
CFSTI Prices: HC $3.00 MF $0.75
KAMAN AIRCRAFT CORP BLOOMFIELD CONN ELECTRONIC SYSTEMS DIV
A STUDY OF REQUIREMENTS FOR ENGINE FAILURE PROTECTIVE WARNING SYSTEMS IN SINGLE-ENGINE TURBINE HELICOPTERS.
Final rept.,
by Lawrence A. Kaufman, and James L. Van Train. Nov 65, 96p. Rept. no. Kaman R-565
Contract DA-44-177-AMC-155 (T) Task 1P121401A14178

Unclassified report

Descriptors: (*Gas turbines, Malfunctions), (*Helicopter engines, Malfunctions), (*Safety devices, Specifications), Helicopters, Aviation safety, Monitors, Flight, Recovery, Failure (Mechanics)

A study was made to evaluate recovery techniques associated with loss of power in single engine helicopters throughout the flight envelopes currently attainable in actual Army missions. The report includes detailed mission profile analyses, helicopter dynamic analysis, and considerations of system design factors. It is concluded that redundant warning of power plant failures is feasible and desirable but that automatic actuation following failure is impractical and unnecessary. (Author)

AD-627 573 Fld. 1/3, 13/6
CFSTI Prices: HC $4.00 MF $0.75
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
THE LIGHT-LINE-TETHERING TECHNIQUE FOR DETERMINING THE AERODYNAMIC DERIVATIVES OF AN AIR CUSHION VEHICLE,
by G. Kurylowich. Sep 65, 121p. Rept. no. UTIAS-110
Contract AF33 (657)-8451

Unclassified report

Descriptors: (*Ground effect machines, Mooring), (*Aerodynamic characteristics, Ground effect machines), Oscillation, Test equipment, Cables (Mechanical), Rotation

A complete feasibility study was performed on a new technique for determining ACV aerodynamic derivatives. A circular track simulated 'ground' while the vehicle, tethered to a centerpost by means of a light cable, flew a circular flight path above the track surface. A step on the 'ground' perturbed the vehicle from equilibrium and the resulting oscillations were recorded by a movie camera. The results obtained indicated that many derivatives were functions of height. Although scatter in the data permitted a qualitative study only, it was concluded that the scatter resulted from random errors in the recorded time histories and the manner in which the cable was attached to the vehicle. By making certain improvements in the experimental design and apparatus (especially using a larger track) it was concluded that all derivatives could be obtained with satisfactory precision with this technique. (Author)

AD-627 362 **See Fld. 11/9**

AD-627 609 **See Fld. 20/4**

AD-627 659 **See Fld. 1/2**

AD-627 664 **See Fld. 17/8**

AD-627 898 **See Fld. 1/1**

1/4. AIRCRAFT FLIGHT INSTRUMENTATION

AD-627 669 Fld. 1/4
CFSTI Prices: HC $6.00 MF $1.25
HUGHES AIRCRAFT CO CULVER CITY CALIF RESEARCH AND DEVELOPMENT DIV
PICTORIAL DISPLAYS FOR FLIGHT.
Final rept.,
by W. L. Carel. Dec 65, 218p. Rept. no. TR-2732.01/40
Contract Nonr-4468 (00)

Unclassified report

Rept. on Proj. JANAIR.

See also AD-613 274.

Descriptors: (*Flight instruments, Display systems), (*Display systems, Flight instruments), (*Instrument panels, Display systems), Mission profiles, Pilots, Human engineering, Navigation, Target recognition, Military tactics, Television display systems, Analog systems

This is the report of a study of examine the potential of raster scan pictorial displays for aircraft application. The scope of the effort was restricted to four mission segments for both normal and steep gradient vehicles for one- or two-place aircraft. The mission segments are: (1) Take off, (2) climb out, (3) point to point navigation, and (4) landing. The program was divided into twp pases; (1) The analysis of the potential of pictorial displays and, (2) The definition of the associated sensor and data processing requirements. The study was conducted with no particular avionics system or aircraft in mind with the result that the report that follows deals with generic problems rather than the tradeoff and design issues specific to a particular system.

AD-627 702 **See Fld. 5/5**

Field 2-AGRICULTURE

AD-627 792 Fld. 2
CFSTI Prices: HC $3.00 MF $0.75
LOCKHEED-CALIFORNIA CO BURBANK
B-26/SST IN-FLIGHT SIMULATION PROGRAM,
by H. E. Worden, C. J. Heirich, and R. F. Livingston. 22 Oct 65, 99p. Rept. no. LR-19129

Unclassified report

Descriptors: (*Supersonic planes, Flight simulators), (*Pilots, Job analysis), (*Instrument landings, Flight simulators), Flight testing, Simulation, Bombers, Transport planes

The simulation was flown by or demonstrated to 25 individuals, of whom 19 were subject pilots, for the purpose of comparing pilot workload involved in making ILS approaches on the frontside and backside of the thrust required curve. Approaches made on the backside of the thrust required curve simulated SST operation with fuel trimmers off, while approaches made on the frontside simulated the SST with fuel trimmers on. Airplane characteristics demonstrated were those with no stability augmentation.

Field 3-ASTRONOMY AND ASTROPHYSICS

3/1. ASTRONOMY

AD-627 451 Fld. 3/1
CFSTI Prices: HC $3.00 MF $0.75
GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT STATION
SOME RESULTS OF RADIOASTRONOMICAL OBSERVATIONS OF SOLAR ECLIPSES,
by A. P. Molchanov. Sep 65, 61p. Rept. no. G-T-R-65-3
Contract AF19 (628)-5034
TT 66-60448

Unclassified report

Nekotorie Resultati Radioastronomicheskikh Nabludenii Solnechnikh Zatmenii, trans. of Pulkovo Astronomicheskoi Observatorii. Izvestiya, v24 n1 (177) p38-56 1964.

Descriptors: (*Radio astronomy, Sun), (*Sun, Radiofrequency spectroscopy), (*Solar eclipses, Radio astronomy), Emissivity, Sunspots, Solar radiation, Solar disturbances, Solar atmosphere, USSR

Results of observations of solar eclipses at cm and dm wavelengths are considered, which are related to emission sources above spot groups on the sun and to brightness temperature distribution on the limb of the solar disk. The analysis of the data obtained made it possible to determine that in the sources observed the emission spectrum showed a sharply defined maximum in the wavelength region between 4.5 and 7.5 cm. A dependence between size and height above the photosphere of the sources and the wavelength is inferred. Conclusions are drawn on the nonlinearity of the dependence between the radiative flux of the source and the area of the corresponding spot group. Comparison of results of observations, carried out at low solar activity, allow it to be stated that the increase of brightness temperature at the edge of the solar disk at 3.2 cm does not exceed 20 percent. Little dependence of the solar radioradius on the wavelength is observed for 2 lambda 10 cm. (Author)

AD-627 520 **See Fld. 5/1**

AD-627 695 **See Fld. 20/4**

3/2. ASTROPHYSICS

AD-627 478 Fld. 3/2, 20/4
CHICAGO UNIV ILL
ON SCHWARZSCHILD'S CRITERION FOR THE STABILITY OF GASEOUS MASSES,

by N. R. Lebovitz. 10 Feb 65, 15p.
AFOSR 65-2072

Unclassified report

Availability: Published in The Astrophysical Journal v142 n1 p229-42 1 Jul 1965. Copies to DDC users only.

Descriptors: (*Gases, Stability), Perturbation theory, Spheres, Potential theory, Calculus of variations, Differential equations

Chandrasekhar's variational expression for the characteristic frequencies of oscillation of spherical gaseous masses is used to show that these frequencies are all real (that is, of stable type) if Schwarzschild's criterion for stability is satisfied. The demonstration is given for a wide class of equilibrium configurations. (Author)

AD-627 535 Fld. 3/2
CFSTI Prices: HC $1.00 MF $0.50
ILLINOIS UNIV URBANA ELECTRICAL ENGINEERING RESEARCH LAB
THE UNIVERSITY OF ILLINOIS RADIO TELESCOPE.
Progress rept. no. 25, 1 Oct-31 Dec 65,
by G. C. McVittie, and G. W. Swenson,Jr.. 31 Jan 66, 7p. Contract Nonr-1834 (22)

Unclassified report

See also AD-614 605.

Descriptors: (*Radio telescopes, Illinois), (*Astronomical observatories, Illinois), Universities, Radio astronomy, Instrumentation, Maintenance, Data processing systems, Astronomical data

A description of the maintenance of, the improvements in the electronics of, and the astronomical discoveries made with, the 600' x 400' parabolic cylinder radio telescope of the University of Illinois. (Author)

AD-627 660 Fld. 3/2, 22/2
CFSTI Prices: HC $2.00 MF $0.50
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF RESEARCH LABS
A MODEL FOR THE LOWER ATMOSPHERE OF MARS BASED ON MARINER IV OCCULTATION DATA,
by Albert D. Anderson. Dec 65, 32p. Rept. no. 6-75-65-62

Unclassified report

Descriptors: (*Mars (Planet), Atmosphere models), (*Planetary atmospheres, Mars (Planet)), (*Atmosphere models, Mars (Planet)), Mars probes, Scientific satellites, Radio waves, Propagation, Atmospheric refraction

The Mariner IV occultation experiment has resulted in several surprising conclusions about the lower atmosphere of Mars, including very low values for the neutral properties (temperature, pressure, and density) and the dominance of CO2. Guided by these new results and theoretical models of the Martian atmosphere, a neutral property model has been derived which takes into account surface air temperature variation. The neutral properties up to 50 km exhibit a strong dependence on the surface temperature. Thus, it appears that the meteorology of Mars, even at the higher altitudes, depends significantly on the surface temperature distribution. An isopycnic (constant density) level is manifested in the model at 10 km where the density value is 5.77 x 0.000001 gm/cc for surface temperatures ranging from 175K to 325K. At 50 km, the density variation for this same surface temperature range is a factor of 4. The height of the tropopause (boundary between convective and radiative equilibrium regimes), taken to vary linearly with the surface temperature, is one of the principal uncertainties since the computed properties are sensitive to it. The accuracy of the model is indicated to decrease with altitude, especially above 30 km where the effects of CO2 photochemistry, doppler broadening, and the departure from local thermodynamic equilibrium start to become important. (Author)

AD-627 689 Fld. 3/2
CFSTI Prices: HC $1.00 MF $0.50
COLORADO UNIV BOULDER DEPT OF ASTRO-GEOPHYSICS
PHYSICS OF THE SOLAR CORONA.
Final rept. 1 Apr 65-31 Jan 66,
by Donald E. Billings. 31 Jan 66, 4p. Contract Nonr (G)-00046-65 Proj. RR-004-06-01

Unclassified report

Descriptors: (*Solar corona, Scientific research), Astrophysics, Reports

The book, 'A Guide to the Solar Corona,' was completed during the Grant period. Also, the following studies were carried to near completion: (1) Physics of flare-induced waves; (2) Ionization and dynamics of yellow-line regions; (3) Heating processes in coronal enhancements; (4) Temperature and density variation of the inner corona during a solar cycle. (Author)

AD-627 800 Fld. 3/2
HARVARD RADIO ASTRONOMY STATION FORT DAVIS TEX
THE VARIABLE SOLAR RADIO SPECTRUM,
by A. Maxwell. Nov 65, 59p. Rept. no. Scientific-6
Contract AF19 (628)-2370 Proj. AF-7649 Task 764906
AFCRL 65-894

Unclassified report

Availability: Published in The Solar Spectrum p342-97 1965. Copies to DDC users only.

Descriptors: (*Solar spectrum, Radio astronomy), (*Radio astronomy, Sun), (*Sun, Radio astronomy), Astrophysics, Solar disturbances, Extraterrestrial radio waves, Radiofrequency spectroscopy

This paper reviews recent experimental and theoretical work concerning the slowly-varying component of solar radio emission, microwave bursts, and the four main spectral types of bursts observed in the meter and decimeter bands. Observational techniques are briefly summarized. The slowly-varying component is believed to be thermal in origin and to come from overdense regions above plages and sunspots. The physical characteristics of this component are tabulated and recent theories of emission processes are discussed. Microwave bursts, as observed by both fixed-frequency and sweep-frequency receivers, are categorized and emission mechanisms for each category are considered. The characteristics and possible origins of Type-I (noise storm) bursts, which originate high in the corona above active sunspots, are reviewed. Type-II (slow-drift) bursts are believed to be generated by disturbances propagating outward through the corona, sometimes non-radially, at velocities of about 1000-15000 km/sec, in regions where the electron density is about 10 times that given by the Baumbach-Allen distribution. Type-III (fast -drift) bursts, generated by an exciter moving at approximately 0.5 c, are also believed to be generated in density condensations and to have a core and halo brightness distribution similar to that of Type-II bursts.

AD-627 966 Fld. 3/2
CALIFORNIA UNIV BERKELEY DEPT OF ASTRONOMY
STUDIES IN STELLAR EVOLUTION. I. THE INFLUENCE OF INITIAL CNO ABUNDANCES IN A STAR OF MASS 2.3,
by Peter Bodenheimer, J. E. Forbes, Nancy L. Gouldand , and L. G. Henyey. 26 Oct 64, 24p.
Contract AF-AFOSR-171-63
AFOSR 65-2818

Unclassified report

Availability: Published in The Astrophysical Journal v141 n3 p1019-42 1 Apr 1965. Copies to DDC users only.

Descriptors: (*Stars, Nuclear reactions), (*Astrophysics, Stars), Equations of state, Carbon, Nitrogen, Oxygen, Abundance

A series of evolutionary sequences have been calculated for a configuration of mass 2.3 magnitude. They cover late pre-main-sequence and main-sequence evolution and differ in their initial chemical compositions. Sequence I begins with concentrations of C, N, and O similar to observed atmospheric values published for stars predominantly of Population I. The C/N and O/N ratios are considerably in excess of their equilibrium values, and there is found to be a pre-main-sequence adjustment period of carbon burning causing an additional pre-main -sequence dip in luminosity on the Hertzsprung-Russell diagram. Sequence IV shows that the dip becomes less marked if the total heavy-element concentration is reduced. Sequence II begins with nearly equilibrium abundances of C (12) and N (14) and the carbon dip is not seen. Sequence III illustrates the effect of increasing the O/N ratio and confirms that O (16) is only very gradually converted to CN isotopes. In a series of appendices we describe the physical approaches and approximations used in these calculations. They are intended to supplement the basic discussion of the numerical technique. They treat the equation of state, opacity, chemical composition changes due to hydrogen burning, chemical homogenization of convective regions, and the obtaining of a starting configuration for an evolutionary sequence. (Author)

AD-627 318 **See Fld. 4/1**

AD-627 416 **See Fld. 4/1**

AD-627 435 **See Fld. 4/2**

AD-627 587 **See Fld. 22/1**

AD-627 876 **See Fld. 3/3**

3/3. CELESTIAL MECHANICS

AD-627 653 Fld. 3/3
CFSTI Prices: HC $1.00 MF $0.50
FRANK J SEILER RESEARCH LAB AIR FORCE ACADEMY COLO
REGULARIZATION AND POWER SERIES SOLUTION FOR THE THIRD ORDER REPRESENTATION OF THE RESTRICTED 3 BODY PROBLEM.
Final rept.,
by Allan F. Schanzle. Dec 65, 23p. Rept. no. SRL-65-00009
Proj. AF-7904 Task 790400

Unclassified report

Descriptors: (*N-body problem, Equations of motion), (*Equations of motion, N-body problem), Power series, Numerical analysis, Celestial mechanics

The equations of motion for the Planer, Circular Restricted Three Body Problem are reduced from the fourth order to a third order system by introducing a new variable. Assuming a Power Series Solution, recurrence formulae are derived for the purposes of numerical integration. Convergence of the series is proved except for three singularities, which are eliminated by regularization. (Author)

AD-627 876 Fld. 3/3, 3/2
HARVARD COLL OBSERVATORY CAMBRIDGE MASS SOLAR DEPT
LUNAR ECLIPSES AND THE FORECASTING OF SOLAR MINIMA,
by Barbara Bell, and John G. Wolbach. 20 Apr 65, 11p. Rept. no. Scientific-8
Contract AF19 (628)-3322 Proj. AF-7649 Task 764906
AFCRL 65-890

Availability: Published in ICARUS v4 n4 p409-14 Sep 1965. Copies to DDC users only.

Descriptors: (*Lunar eclipses, Astronomical data), (*Sunspots, Mathematical prediction), Celestial mechanics, Moon, Solar disturbances, Correlation techniques

It is shown that an equation, derived by Danjon from a study of the variation in brightness of the eclipsed Moon with phase of the sunspot cycle, predicts dates in good agreement with observed sunspot minima in 1923, 1933, 1944, 1954, and 1964, and for all minutes back to 1823. Even better agreement is obtained by the addition of 0.4 yr to the constant term of Danjon's equation, from which it is inferred that the discontinuity in eclipse brightness occurs on the average 4-5 months before sunspot minimum. Predictions of future minima are given, the next one being 1974.9 plus or minus 0.3. (Author)

AD-627 306 **See Fld. 9/2**

Field 4-ATMOSPHERIC SCIENCES

4/1. ATMOSPHERIC PHYSICS

AD-627 318 Fld. 4/1, 3/2
CFSTI Prices: HC $1.00 MF $0.50
HARVARD COLL OBSERVATORY CAMBRIDGE MASS
INVESTIGATIONS OF THE IONOSPHERIC REGIONS ABOVE MAXIMUM OF F LAYER BY UTILIZING OBSERVATIONS OF EXTRATERRESTIAL RADIO NOISE.
Final rept., 1 Jan 64-31 Oct 65,
by G. Richard Huguenin. Jan 66, 25p. Contract AF19 (628)-3890 Proj. AF-8605 Task 860505
AFCRL 66-26

Unclassified report

Descriptors: (*Ionosphere, Extraterrestrial radio waves), (*Extraterrestrial radio waves, Noise (Radio)), Atmospheric sounding, Sounding rockets, Plasma physics, Ionospheric propagation, Radio astronomy

Research was primarily directed towards an understanding of the interaction between the Earth's ionosphere and observations of long-wavelength radio noise of extra-terrestrial and terrestrial origin. The two primary satellite programs carried out were unsuccessful as both satellites failed to achieve orbit. The bibliography results from a high-altitude rocket probe and theoretical studies are included. (Author)

AD-627 323 Fld. 4/1, 18/3, 14/2
CFSTI Prices: HC $4.00 MF $0.75
AMERICAN SCIENCE AND ENGINEERING INC CAMBRIDGE MASS
RESEARCH DIRECTED TOWARD THE STUDY OF NUCLEAR RADIATION.
Final rept. 25 Jan 62-24 Jul 65,
by Theodore B. Barrett, and Jack W. Carpenter.
6 Oct 65, 111p. Rept. no. ASE-1111
Contract AF 19 (628)-349 Proj. AF-8653, DASA-A6a
AFCRL 65-801

Unclassified report

Descriptors: (*Photometers, Atmospheric sounding), (*Aurorae, Nuclear explosions), (*Sky brightness, Nuclear explosions), (*Nuclear explosions, Meteorological phenomena) High altitude, Explosion effects, Ionospheric disturbances, Optical scanning, Airborne, Optical equipment, Wide-field cameras, Research planes

The design and description of the optical system for installation in the KC-135 airborne laboratory of AFCRL are presented. The optical system consists of a 4-barrel photometer mounted co-axially with a 16 mm, narrow field-of-view camera as well as 35 mm and 16 mm all-sky cameras. The 4-barrel photometer is capable of either fast-time high-level response for use against artificially induced auroras or by use of the chopper and synchronous detection to monitor the very low-level night airglow radiations. The tilting filter technique is employed on the photometer to monitor the continuum contribution to the line and band intensities to be measured. An automatic calibration system using phosphors excited by C (14) radioisotope decay is incorporated. The photometer uses interference filters centered at 4278 A, 4861 A, 5577 A and 6300 A. (Author)

AD-627 416 Fld. 4/1, 3/2, 8/14
CFSTI Prices: HC $3.00 MF $0.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
SOLAR PROTONS AND MAGNETIC STORMS,
by G. F. Pieper, A. J. Zmuda, and C. O. Bostrom.
Jul 62, 73p. Rept. no. TG-442
Contract NOw-62-0604-c

Unclassified report

Descriptors: (*Protons, Solar radiation), (*Solar radiation, Protons), (*Magnetic storms, Solar radiation), Cosmic rays, Solar disturbances, Ionospheric disturbances, Atmospheric sounding, Scientific satellites, Radiation measurement systems

The purpose of this paper is to report satellite observation of solar cosmic rays in a low energy range, to make comparisons with other observations, and to present detailed data concerning the time dependence of these particle fluxes and their relation to solar, geomagnetic and associated phenomena. These data make it possible to infer certain relationships between the various events observed, and to propose a general picture for the sequence of such events.

AD-627 541 Fld. 4/1
CALIFORNIA UNIV BERKELEY DEPT OF PHYSICS
OBSERVATIONS OF THE ASSOCIATION OF AURORAL LUMINOSITY WITH AURORAL X-RAYS AND COSMIC NOISE ABSORPTION,
by T. J. Rosenberg. 3 Feb 65, 10p. Contract AF-AFOSR-331-63
AFOSR 65-2798

Unclassified report

Availability: Published in Journal of Atmospheric and Terrestrial Physics v27 p751-9 1965. Copies to DDC users only.

Descriptors: (*Aurorae, Atmospheric sounding), (*Atmospheric sounding, Aurorae), Meteorological phenomena, Luminescence, Bremsstrahlung, X-rays, Absorption, Extraterrestrial radio waves, Correlation techniques

Simultaneous observations of auroral luminosity and bremsstrahlung X-rays from the same balloon payload are reported here. Comparison of the balloon measurements with riometer records has shown the same variety of associations that appear in other studies of auroral phenomena. Because the photometer and scintillation counter geometries are fixed relative to each other and view equivalent regions of the sky at the production layer, it has been possible to investigate behavioral differences in the low and high energy portions of the precipitated electron spectrum with more certainty than when comparing balloon and ground-based observations. Certain aspects of the present observations suggest that temporal variations in these two energy ranges are rather independent, on occasion. These observations support the suggestion that two mechanisms having characteristically different energy spectra control the acceleration and/or precipitation of energetic electrons. Correlations of auroral luminosity with X-rays then depend upon the degree of coupling between the mechanisms. (Author)

AD-627 607 Fld. 4/1, 8/10
CFSTI Prices: HC $3.00 MF $0.75
ELECTRICAL ENGINEERING RESEARCH LAB UNIV OF TEXAS AUSTIN
SOME METEOROLOGICAL AND OCEANOGRAPHIC CHARACTERISTICS OF THE GOLDEN GATE CALIFORNIA AREA,
by K. H. Jehn, J. R. Gerhardt, D. F. Metcalf, and S. J. Prosser. 26 Feb 54, 82p. Rept. no. EERL-3-13 ,CM-760
Contract NOrd-9195

Unclassified report

Descriptors: (*San Francisco Bay, Geography), (*Meteorology, San Francisco Bay), (*Oceanology, San Francisco Bay), Bays, California, Tables, Graphics, Microwaves, Propagation

A series of low-level temperature and moisture soundings taken on the southern shore of the Golden Gate channel during April, 1953 in connection with certain microwave propagation tests are analyzed to determine the refractive index gradients in the first few hundred feet above the channel. While most of the soundings show the essentially uniform standard gradients to be expected in an air mass having a long overwater trajectory and compare favorably with the existing Oakland, California radiosonde observations, certain smaller scale features involving elevated substandard layers and sea breeze ducts are occasionally found which cannot be correlated with larger scale surface or upper air weather data. A second phase of the report consists of the analysis of series of wave gage recordings of the water surface.

AD-627 759 Fld. 4/1, 18/8
CALIFORNIA UNIV BERKELEY
STORAGE OF RADIOACTIVE DEBRIS IN THE POLAR VORTEX,
by J. R. Barcus. 1 Feb 65, 4p. Contract Nonr-3656 (13) ,AF-AFOSR-331-63
AFOSR 65-2787

Unclassified report

Availability: Published in Journal of Atmospheric Sciences v22 n4 p460-2 Jul 1965. Copies to DDC users only.

Descriptors: (*Radioactive fallout, Polar regions), Atmospheric motion, Vortices, Transport properties, Fission products, Nuclear explosions, Atmospheric sounding, Stratosphere, Balloons, Alaska

The letter presents several observations of the storage of radioactive debris in the polar stratosphere. The measurements were made incidentally to a series of high altitude balloon flights primarily intended for auroral zone research and released from Point Barrow, Alaska, during March 1963. This period followed by some months an intensive high latitude series of atmospheric nuclear tests which had been conducted by the USSR from 5 August to 25 December 1962.

AD-627 927 Fld. 4/1, 16/1
CFSTI Prices: HC $2.00 MF $0.50
PACIFIC MISSILE RANGE POINT MUGU CALIF
DIFFUSION OF CONTAMINATION FROM A SOURCE OF FINITE EXTENT.
Technical memo.,
by H. F. Ludloff. 3 Feb 66, 34p. Rept. no. PMR-TM-65-4

Unclassified report

Descriptors: (*Diffusion, Air pollution), (*Guided missile ranges, Air pollution), (*Air pollution, Guided missile ranges), Exhaust gases, Toxicity, Atmosphere, Transport properties, Micrometeorology, Mathematical analysis

AD-628 037 Fld. 4/1
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
INTENSITY CONNECTION OF THE ELECTRIC FIELD OF THE ATMOSPHERE WITH AURORA POLARIS,
by T. V. Lobodin. 21 Oct 65, 10p. Rept. no. FTD-TT-65-855
TT 66-60506
Unclassified report

Unedited rough draft trans. of Geofizicheskii Byulleten (USSR) n13 p38-40 1963.

Descriptors: (*Atmospheric electricity, Polar regions), (*Aurorae, Atmospheric electricity), Electric fields, Intensity, Geophysics

AD-627 350 **See Fld. 17/8**

AD-627 403 **See Fld. 20/14**

AD-627 435 **See Fld. 4/2**

AD-6 7 520 **See Fld. 5/1**

AD-627 538 **See Fld. 20/14**

AD-627 554 **See Fld. 7/4**

AD-627 555 **See Fld. 7/4**

AD-627 615 **See Fld. 17/9**

AD-627 675 **See Fld. 20/14**

AD-627 722 **See Fld. 17/7**

4/2. METEOROLOGY

AD-627 349 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
THE VERTICAL DISTRIBUTION OF WATER VAPOR OVER KWAJALEIN ATOLL, MARSHALL ISLANDS.
Final rept.,
by H. J. Mastenbrook. 30 Dec 65, 15p. Rept. no. NRL-6367
Proj. P03-0016/3100-81004 Task FASS-00-005/652-1/R004-02-01 ,PMR-RDD-4122
Unclassified report

Descriptors: (*Humidity, Kwajalein Atoll), (*Kwajalein Atoll, Humidity), (*Water vapor, Atmospheric sounding), Airborne, Meteorological balloons, Hygrometers, Marine meteorology, Pacific Ocean isla

Five balloon flights with a frostpoint hygrometer sounding instrument provided measurements of the vertical distribution of water vapor over Kwajalein, in the Marshall Islands, during the month of November 1963. A consistent water vapor distribution is observed, showing a moist surface layer beneath the trade-winds inversion, a dry trade-wind layer above the inversion, and near saturation conditions in the upper troposphere. The stratospheric distribution approximates a constant watervapor-to-air mixing ratio in the range of 1 to 4 parts per million. (Author)

AD-627 355 Fld. 4/2, 8/6
CFSTI Prices: HC $6.00 MF $1.50
MIAMI UNIV CORAL GABLES FLA INST OF MARINE SCIENCE
PROCEEDINGS OF THE 1965 ARMY CONFERENCE ON TROPICAL METEOROLOGY HELD IN MIAMI BEACH, FLORIDA, 6-7 MAY 1965.
Rept. no. 9,
by Homer W. Hiser, and Harold P. Gerrish. Dec 65, 271p. Rept. no. 8188-1 ,ML-65372
Contract DA-28-043-AMC-00443 (E) Proj. DA-1V0.14501.B53A.09.07
Unclassified report

Descriptors: (*Meteorology, tropical regions), (*Tropical regions, Meteorology), Army research, Symposia, Meteorological phenomena, Africa, Southeast Asia, Central America, Marine meteorology, Climatology

The primary interest of the meeting was in the realm of local, small scale meteorological phenomena and problems in the tropics, specifically excluding hurricanes and typhoons, although the papers were not completely limited to those topics. One objective was to learn as much as possible about the recent results and future research plans in tropical meteorology of the U. S. Army contractors as well as other invited guests from the United States and abroad. Nineteen papers were presented at the two-day meeting. Discussions of the papers were recorded and are included in the Proceedings. (Author)

AD-627 386 Fld. 4/2, 8/6
CFSTI Prices: HC $4.00 MF $0.75
WEATHER BUREAU WASHINGTON D C
SOME CLIMATIC FEATURES OF THE NORTHWESTERN SLOPE OF THE GREENLAND ICE CAP (EAST OF THULE).
Final rept. 15 Sep 64-15 Mar 65,
by Nina A. Stepanova, and P. Putnins. 15 Mar 65, 110p. Proj. DA-1V0-14501-B-53A-05
Unclassified report

Descriptors: (*Climatology, Greenland), (*Meteorology, Greenland), (*Greenland, Climatology), Ice islands, Meteorological parameters, Tables

The climatic observations at three stations along the slope and at one station at the edge of the ice cap, east from Thule, were evaluated. The following elements were analyzed. Temperature: Annual and diurnal course of temperature, extreme temperatures, aperiodic fluctuation of temperature (also a case of strong warming along the slope was investigated), temperature lapse rates along the NW and SW slopes of the Greenland ice cap. Wind regime: Frequencies of wind directions, mean wind speed, miximum wind speed. Cloudiness: Annual and diurnal variation of cloudiness, frequencies of clear and overcast sky, diurnal range of cloudiness; a case of sudden extreme change of cloudiness was analyzed. (Author)

AD-627 435 Fld. 4/2, 4/1, 3/2
CFSTI PricesMF $1.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
METEOROLOGICAL AND GEOASTROPHYSICAL ABSTRACTS. VOLUME 16. NUMBER 9. SEPTEMBER 1965,
by Malcolm Rigby. Jan 66, 305p.
Unclassified report

Availability: HC available from American Meteorological Society, 45 Beacon St., Boston, Mass., 02108. CFSTI MF $1.50.

Descriptors: (*Meteorology, Bibliographies), (*Geophysics, Bibliographies), (*Astrophysics, Bibliographies), Abstracts

AD-627 442 Fld. 4/2, 22/2, 15/7
CFSTI Prices: HC $2.00 MF $0.50
ARACON GEOPHYSICS CO CONCORD MASS
METEOROLOGICAL SATELLITE TECHNIQUES FOR THE ARMY.
Quarterly rept. no. 2, 1 Aug-31 Oct 65,
by P. E. Sherr, R. J. Boucher, W. K. Widger,Jr., C. W. C. Rogers, and J. C. Barnes. Nov 65, 44p. Rept. no. 9G21-7
Contract DA-28-043-AMC-01273 (E) Proj. DA-1V0-14501-A-126 Task 1V014501A12601
Unclassified report

See also AD-623 532.

Descriptors: (*Meteorological satellites, Army research), (*Weather forecasting, Army operations), (*Army operations, Weather forecasting), Military personnel, Military training, Meteorology, Handbooks

The research was reported herein was conducted during the second quarter of a contractual investigation was aimed at providing the Army field units with techniques for the use of weather satellite data. Results to date for each of several tasks are discussed. These include: (1) mesoscale analysis and interpretation studies; (2) analysis of Army requirements for applications of weather satellite data; (3) case studies of World War II, Korean or U. S. field maneuver synoptic situations, using analogs for which satellite data are available; (4) investigations of methods for determining weather affecting enemy operations; (5) procedures for field use of meteorological satellite data; and (6) operational guide preparation. Examples of the types of analyses being prepared for the tasks concerned with mesoscale studies, case studies, and weather affecting enemy operations are presented and discussed. A rather complete description of the applicability of satellite data to Army meteorological requirements is presented and outlines the capabilities of the satellite to observe various meteorological parameters such as, wind, temperature, and visibility. (Author)

AD-627 531 Fld. 4/2, 8/8
CFSTI Prices: HC $2.00 MF $0.50
WISCONSIN UNIV MADISON DEPT OF METEOROLOGY
ON THE DISTRIBUTION OF LAKE TEMPERATURES IN CENTRAL CANADA AS OBSERVED FROM THE AIR.
by James T. Peterson. Dec 65, 44p. Rept. no. TR-22
Contract Nonr-1202 (07) Proj. NR-387-022
Unclassified report

Descriptors: (*Micrometeorology, Lakes), (*Lakes, Climatology), (*Climatology, Lakes), Canada, Hydrology, Surface temperature, Infrared scanning, Airborne, Infrared equipment, Marine meteorology

Lake surface temperatures in central Canada were observed from the air with an infrared thermometer during spring and fall of 1963 and 1964. The surface temperatures of up to 300 lakes, separated by as much as 700 miles, were obtained on each of several days. The relation between these observed temperatures and meteorological, morphological, and geographical parameters was investigated. Using multiple regression equations, the temperature data were represented as a function of latitude, longitude, size (S), and S square. The computed isotherms of lake temperature were generally oriented northwest-southeast, in a pattern similar to the mean air temperature isotherms for the previous month. The regression surfaces also showed that the strongest gradient of lake surface temperatures was near the zone of frozen lakes. The fetch and depth of a lake were found to influence lake surface temperatures, i.e. large, deep lakes are colder than small, shallow lakes in spring and warmer in fall. Linear regression analysis implied that fetch alone is a relatively poor predictor of surface temperature. The relation between mean depth and lake surface temperature appeared to be non-linear. Large diurnal changes and the effect of the wind on lake surface temperature were observed during spring and summer. (Author)

AD-627 532 Fld. 4/2, 8/6
CFSTI Prices: HC $4.00 MF $0.75
WISCONSIN UNIV MADISON DEPT OF METEOROLOGY
THE USE OF SUB-ARCTIC BOGS AS NATURAL CLIMATIC INDICATORS,
by Bernhard Lettau. Jan 66, 124p. Rept. no. TR-23
Contract Nonr-1202 (07) Proj. NR-387-022
Unclassified report

Descriptors: (*Swamps, Climatology), (*Climatology, Swamps), (*Micrometeorology, Swamps), Soils, Surface temperatures, Canada, United States

The physical interaction of the atmosphere and the ground surface has been investigated in a particular attempt to derive climatic temperature values from a very limited amount of observed soil temperature data. A model is proposed in which the Fourier equation pertaining to the sinusoidal variation of temperature in a homogeneous medium has been used to generate soil temperature profiles at a given time, which are compared to observed temperature profiles. The estimated annual annual course of temperature at the ground surface agrees quite well with observed air temperatures at nearby stations during summer, but exceeds the observed air temperatures appreciably in winter. Based on the cases studied it can be assumed however, that the estimated parameters accurately represent the temperature field within the ground. This technique therefore has important applications in the field of phytoclimatology. With respect to temperature variations, sphagnum bogs have been shown to serve very well as natural climatic indicators. (Author)

AD-627 572 Fld. 4/2, 14/2
CFSTI Prices: HC $2.00 MF $0.50
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
A TURBULENCE PROBE UTILIZING AERODYNAMIC LIFT,
by T. E. Siddon. Jun 65, 40p. Rept. no. UTIAS-TN-88
Contract AF-AFOSR-223-64 ,AF-AFOSR-672-64

Unclassified report

Descriptors: (*Anemometers, Turbulence), Velocity, Lift, Aerodynamic characteristics, Canada, Feasibility studies, Correlation techniques

The concept of a new-type of anemometer for measuring the cross-stream or 'v'-component of turbulent velocity is presented. Basic theory concerning the response characteristics of the so-called 'aerofoil probe' is discussed. Steps in the development of a satisfactory prototype of the 'aerofoil probe' are outlined. Various problems concerning resonant frequencies, accelerometric effects, low-frequency response fall-off, and the effect of finite aerofoil size were encountered, and these are described in detail. A method of dynamic calibration employing a square-wave turbulence simulator is outlined. Various experimental data accumulated from measurements in a low-speed turbulent air jet are presented. These include velocity measurements, frequency spectra, autocorrelations, and two point space-time correlations. Comparisons with hot-wire data are made wherever possible. Conclusions are drawn as to feasibility of using the aerofoil probe in preference to hot-wire techniques for turbulence measurements. Limitations of both techniques are compared. (Author)

AD-627 985 Fld. 4/2, 8/12
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
THE INFLUENCE OF THE ARCTIC PACK ICE ON CLIMATE,
by J. O. Fletcher. Jan 66, 26p. Rept. no. P-3208-1

Unclassified report

Descriptors: (*Climatology, Arctic regions), (*Arctic regions, Climatology), (*Ice islands, Arctic regions), Arctic Ocean, Ice, Heat transfer, Glaciers

An assessment is made of each component of the heat budgets of the surface and of the earth–atmosphere system in the central Arctic, both for an ice-covered ocean and for an ice-free ocean. The annual patterns of atmospheric heat loss for both conditions are obtained as residuals; the relation of these patterns to general atmospheric circulation and glacier accumulation is discussed. It is shown that atmospheric cooling in the Arctic is closely related to certain indices of atmospheric circulation. An ice-free Arctic Ocean would probably be associated with atmospheric circulation more vigorous in summer at subarctic latitudes and of comparable vigor in winter. The cool summers and warm, moist winters would be highly conducive to glacier growth. (Author)

AD-627 439 See Fld. 20/14

AD-627 603 See Fld. 20/14

AD-627 604 See Fld. 20/14

AD-627 637 See Fld. 13/13

AD-627 667 See Fld. 8/12

AD-627 868 See Fld. 9/6

AD-627 879 See Fld. 17/9

Field 5-BEHAVIORAL AND SOCIAL SCIENCES

5/1. ADMINISTRATION AND MANAGEMENT

AD-627 300 Fld. 5/1, 20/12, 11/6, 8/7, +
CFSTI Prices: HC $3.00 MF $0.75
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND APPLIED PHYSICS
PROGRAM IN THE MATERIALS SCIENCES.
Rept. for Jul 64-Sep 65.
Nov 65, 78p. Contract SD-88

Unclassified report

Descriptors: (*Materials, Scientific research), Solid state physics, Metallurgy, Mechanics, Chemistry, Geology, Abstracts

AD-627 310 Fld. 5/1, 12/2
CFSTI Prices: HC $1.00 MF $0.50
BALLISTIC RESEARCH LABS ABERDEEN PROVING GROUND MD
ON CHOICE OF LONG RANGE STUDY TASKS.
Memorandum rept.,
by William J. Sacco. Aug 65, 13p. Rept. no. MR-1693
Proj. DA-1P014501A14B

Unclassified report

Descriptors: (*Management planning, Army research), (*Army research, Management planning), (*Military requirements, Army research), Armed forces research, Costs, Dynamic programming, Army budgets, Armed forces budgets

A choice problem in program development is to select from among the 'Tasks' proposed in support of postulated 'Hypothetical Concepts' those which will give a maximum predicted work within the overall constraints of program funding. A paper presented at the 1964 Army Operations Research Symposium (F. Hill and L. Roepcke. 'An analytical aid in the choice of long-range study tasks.' Proceedings of U. S. Army Operations Research Symposium, May 1964) deals with an analytical method for aiding in the choice of long range study tasks. The first step in the procedure is to determine the maximum predicted worth of the entire program as a function of the total funds available without regard to funding category constraints. A dynamic programming solution for this phase of the problem is presented in this paper. (Author)

AD-627 314 Fld. 5/1
CFSTI Prices: HC $3.00 MF $0.75
OFFICE OF AEROSPACE RESEARCH WASHINGTON D C
OAR PROGRESS '65.
1965, 83p. Rept. no. OAR-65-8

Unclassified report

Descriptors: (*Air force research, Reviews), Physics, Nuclear physics, Chemistry, Mathematics, Electronics, Materials, Mechanics, Energy conversion, Geology, Atmosphere, Astronomy, Astrophysics, Biology, Medicine, Psychology, Sociology

Contents: OAR complex; Scientific advisory group; Financial resources; Human resources; Recognition of effort; Logistics; Future outlook; Research information activities; Scientific progress, FY 65 (General physics, Nuclear physics, Chemistry, Mathematical sciences, Electronics, Materials research, Mechanics, Energy conversion, Terrestrial sciences, Atmospheric sciences, Astronomy and astrophysics, Biological and medical sciences, Behavioral and social sciences).

AD-627 327 Fld. 5/1, 5/3
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
INTEGRATING VIEW OF FEDERAL PROGRAM BUDGETING,
by W. Z. Hirsch. Dec 65, 35p. Rept. no. RM-4799-RC

Unclassified report

Descriptors: (*Federal budgets, Management planning), Costs, Economics, United States Government, National defense, Law, Sociology, Cost effectiveness

The major objective of the memorandum is to propose an overall budget format for use in planning, appropriation, administration, and control within the entire Federal establishment. Program budgeting can aid in the preparation of operationally meaningful information on inputs and outputs, by paying due regard to policy objectives, costs, and time discussions. A program is a cluster of government activities that are in closer competition with each other than with those outside the program and whose output has a clearly identifiable purpose. It ties together various interdependent activities that enter into the output and about which decisions need to be made. For certain purposes it is useful to consider that the Federal government is concerned with five major decision areas --maintenance of national security, maintenance of law and order, social development, and general government operations.

AD-627 398 Fld. 5/1
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
SCHEDULE ANALYSIS PROCEDURE,
by R. P. Rich. Apr 60, 34p. Rept. no. TG-397
Contract NOrd-7386

Unclassified report

Descriptors: (*Research program administration, Scheduling), (*Management planning, Time), Stochastic processes, Digital computers, Probability, Numerical methods and procedures

The report describes a Schedule Analysis Procedure for use with the time schedule of a Research and Development (R and D) Program. The procedure is: (1) Identify certain clearly definable time points, called events, within the R and D program. (2) Identify the activities which must be carried out in order to get from each event to its immediate successors. (3) Obtain statistical estimates of the amount of time required for each of these activities. (4) Analyze the network of events and activities so defined to determine potential critical activities and chains of activities. (5) Take the necessary action--rescheduling, expediting, application of additional effort, etc.--to relieve the criticality. (6) Repeat as the needs of the program indicate. Step 4 can be carried out on a digital computer in an expeditious fashion, but clearly the results of this step will be of little value unless the inputs de-

rived from steps 1 - 3 are reasonably reliable, and the corrective action in step 5 is taken. (Author)

AD-627 408 Fld. 5/1
CFSTI Prices: HC $3.00 MF $0.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
APL/JHU PERT REPORTING PROCEDURES.
Revised ed.
Mar 64, 78p. Rept. no. TG-411-2
Contract NOw-62-0604-c
Unclassified report

Descriptors: (*Research program administration, Scheduling), (*Management planning, Time), Digital computers, Programming (Computers), Coding, Input-output devices, Punched cards

The APL/JHU PERT Milestone reporting system has been established as a management technique for determining the status of research, development, and engineering phases of programs for which the Applied Physics Laboratory serves as technical director. The principal revisions included in this edition are as follows: The treatment and construction of milestone events have been changed. The treatment and construction of interface events have been changed, and the concept of 'initial' activities has been introduced. The event numbering system has been revised. Procedures for encoding of network revisions have been extensively modified. Additional examples of summary report formats have been added. Transaction codes on the input cards have been modified. The relation of the PERT system to the corresponding computer programs has been more fully developed. The concept of 'potential slack' has been introduced.

AD-627 418 Fld. 5/1, 9/2
CFSTI Prices: HC $3.00 MF $0.75
RESEARCH ANALYSIS CORP MCLEAN VA
AN INDIVIDUAL SYSTEM/ORGANIZATION COST MODEL. VOLUME I. CONCEPT AND APPLICATION.
Technical paper,
by John J. Surmeier. Nov 65, 67p. Rept. no. RAC-TP-183
Contract DA-44-188-ARO-1
Unclassified report

Descriptors: (*Costs, Programming (Computers)), (*Military organizations, Costs), Armed forces supplies, Reconnaissance aircraft, Logistics

The Individual System/Organization Cost (ISOC) Model was devised for the rapid costing of a large number of alternative systems or organizations. The ISOC Model is a flexible IBM 7040 FORTRAN IV computer framework to which a variety of individual system or organization cost models may be adapted for use in cost studies requiring numerous calculations that cannot be performed conveniently by hand. This paper is an introduction to the ISOC Model. The basic features of the model and the general procedures for its operation are described. An example is provided on the adaptation of a specific cost model, the surveillance Aircraft System Cost Model, to the computer framework of the ISOC Model. Fictitious data values for two hypothetical surveillance-aircraft systems illustrate procedures for translating data requirements for a specific cost model into a form usable in the ISOC Model. In actual practice the configuration of the ISOC Model will vary according to the costing problem to which it is applied. (Author)

AD-627 520 Fld. 5/1, 9/2, 3/1, 17/9, +
CFSTI Prices: HC $3.00 MF $0.75
LINCOLN LAB MASS INST OF TECH LEXINGTON
GENERAL RESEARCH.
Quarterly technical summary, 1 Aug-31 Oct 65,
by Frederick C. Frick, V. Alexander Nedzel, Stephen H. Dodd, Melvin A. Herlin, and Jerome Freedman. 15 Nov 65, 68p. Contract AF19 (628)-5167 Proj. AF-649L
ESD TDR-65-505
Unclassified report

See also AD-623 651.

Descriptors: (*Data processing systems, Scientific research), (*Radar, Scientific research), (*Radio communication systems, Scientific research), (*Solid state physics, Scientific research), Computers, Circuits, Lasers, Mechanical engineering, Amplifiers, Microwave equipment, Semiconductor devices, Atmosphere, Computer storage devices, Man-machine systems

This Quarterly Technical Summary covers the period from 1 August through 31 October 1965. It consolidates the reports of Division 2 (Data Systems), Division 3 (Radio Physics), Division 4 (Radar), Division 7 (Engineering), and Division 8 (Solid State) on the General Research Program at Lincoln Laboratory. (Author)

AD-627 648 Fld. 5/1
CFSTI Prices: HC $2.00 MF $0.50
PITTSBURGH UNIV PA GRADUATE SCHOOL OF BUSINESS
NORMS FOR A PROGRAM OF EXERVISES FOR MANAGEMENT AND ORGANIZATIONAL PSYCHOLOGY.
Technical rept.,
by Bernard M. Bass, and Susan Wolpert. 15 Jan 66, 33p. Rept. no. TR-10
Contract Nonr-624 (14)
Unclassified report

Descriptors: (*Management engineering, Training), (*Decision making, Management engineering), Personnel, Applied psychology, Problem solving, Attitudes, Behavior, Simulation

Up to 119 graduate business students and 96 middle managers completed a set of 10 exercises in small groups. The normative distributions of results for each exercise are presented along with a description of each exercise and some inferences drawn about differences in behavior of managers and students faced with the same simulated organizational problems. (Author)

AD-627 994 Fld. 5/1
CFSTI Prices: HC $7.00 MF $1.50
SPECIAL PROJECTS OFFICE (NAVY) WASHINGTON D C
SP PERT HANDBOOK.
25 Oct 65, 313p. Rept. no. SPINST-P5000.11
Unclassified report

Descriptors: (*Management control systems, Handbooks), Management planning, Time, Costs, Management engineering, Scheduling

Contents: PERT and the management process; Identification and organization of objectives; Planning to attain objectives; Scheduling to achieve objectives; Regular progress reporting, analysis, and management action; Recycling of the management process to incorporate new action; PERT COST; The cost application and control; Analysis; Cost simulation in recycling of the management process; Implementation and operation of PERT; PERT IN pre-Award; EDP procedures for PERT TIME; EDP procedures for PERT.

AD-628 009 Fld. 5/1
CFSTI Prices: HC $5.00 MF $1.00
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
A COMPARISON OF THE NEEDS OF PROGRAM AND FUNCTIONAL MANAGEMENT.
Master's thesis,
by Craig Harrison Smyser. Sep 65, 172p. Rept. no. GSM/SM/65-22
Unclassified report

Descriptors: (*Management engineering, Effectiveness), Weapons, Weapon systems, Logistics, Leadership

The complete weapons acquisition environment has necessitated the adoption of the systems approach and the new managerial tool of program management. The traditional management theories on authority and responsibility and organization need re-evaluation in light of this new program management concept. Analysis of the existing literature and field research within the General Electric Company has revealed that the program manager has different basic needs than the functional manager. A comparison of these needs indicates that the needs of the functional manager are still evident to a lesser degree in the program area. In general, program management must be recognized as a distinct management function which has brought with it a new type of authority, program authority, which needs to be incorporated with the present management theories. This will allow more effective recognition of the role of the program manager, and thus achieve maximum benefit from the employment of program management. (Author)

AD-627 384 See Fld. 5/2

AD-627 431 See Fld. 20/3

AD-627 507 See Fld. 13/10

AD-627 587 See Fld. 22/1

AD-627 611 See Fld. 14/1

AD-627 709 See Fld. 5/9

AD-628 011 See Fld. 14/1

5/2. DOCUMENTATION AND INFORMATION TECHNOLOGY

AD-627 384 Fld. 5/2, 15/5, 5/1
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
SYSTEMS ANALYSIS AS AN AID IN AIR TRANSPORTATION PLANNING,
by Donald M. Fort. Jan 66, 39p. Rept. no. P-3293
Unclassified report

Descriptors: (*Air transportation, Management planning), Systems engineering, Supersonic planes, Commercial planes, Transport planes, Costs

This paper discusses possible uses and limitations of systems analysis as an aid in air transportation planning. Following some general remarks on the subject, consideration is given to the application of systems analysis to a few arbitrarily selected non-military air transportation planning problems, to illustrate various pertinent points. The emphasis is on the important initial steps in formulating the analysis, beginning with the identification and definition of the problem. The need for realistic and relevant inputs is stressed. No attention is given to particular analytical or computational models or techniques. It is suggested that systems analysis can be anything from very useful to worse than useless in air transportation planning, depending on the quality of the analysis. (Author)

AD-627 791 Fld. 5/2, 5/7, 9/2
CFSTI Prices: HC $1.00 MF $0.50
LINGUISTICS RESEARCH CENTER UNIV OF TEXAS AUSTIN
RETRIEVAL SYSTEM EXPERIMENTATION AND EVALUATION AT LRC,
by A. G. Dale. Dec 65, 14p. Rept. no. LRC-65-WT-2
Contract NSF-G-308
Unclassified report

See also PB-166 121, PB-166 123, PB-168 756.

Descriptors: (*Reports, Information retrieval), (*Information retrieval, Effectiveness), Man-machine systems, Vocabulary, Subject indexing, Word association, Tests

A time-shared experimental document retrieval system under development at The University of Texas is briefly described. A method of evaluating the effect on retrieval performance of controlled changes in the retrieval processor is proposed. (Author) (Presented at the NATO Advanced Study Institute on Evaluation of Information Retrieval Systems, The Hague, July 12-23, 1965)

AD-627 802 Fld. 5/2
CFSTI Prices: HC $3.00 MF $0.75
AEROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D C
ORGANIZATION OF SCIENTIFIC AND TECHNICAL INFORMATION IN THE COMMUNIST WORLD,
by A. I. Mikhaylov, A. I. Chernyi, and R. S. Gilyarev. 24 Jan 66, 97p. Rept. no. ATD-66-11
TT 66-60478
Unclassified report

Trans. of mono. Osnovy Nauchnoi Informatsii, Moscow, 1965 656p. Rept. on Surveys of Communist World Scientific and Technical Literature.

Descriptors: (*Documentation, USSR), (*Technical information centers, USSR), (*Scientific research, Documentation), Bibliographies, Abstracts, Libraries, Information retrieval, Scientific organizations, State-of-the-art reviews

The report presents information on the All-Union Institute of Scientific and Technical Information (VINITI). Recent administrative changes affecting VINITI are briefly discussed. The first section describes the components of the information network organized by the 11 May 1962 decree of the Council of Ministers: the VINITI itself and the analogous information services, either planned or already in existence. Functions and tasks of the following information agencies are covered: VINITI, Central Scientific Research Institute on Patent Information and Technical and Economic Research (TsNIIPI), The All-Union Scientific Research Institute of Medical and Medicotechnical Information (VNIIMI), The Central Institute of Scientific Information on Construction and Architecture (TsINIS), The All-Union Institute of Scientific and Technical Information on Agriculture (VINTI), and information agencies of the State Committee on Standards, Measures, and Measuring Instruments, USSR (VNIIKI). (Author)

AD-627 845 Fld. 5/2
CFSTI Prices: HC $1.00 MF $0.50
REDSTONE SCIENTIFIC INFORMATION CENTER REDSTONE ARSENAL ALA
METHODS FOR SATISFYING THE NEEDS OF THE SCIENTIST AND THE ENGINEER FOR SCIENTIFIC AND TECHNICAL INFORMATION,
by Hubert Murray,Jr.. 11 Jan 66, 19p. Rept. no. RSIC-510
Unclassified report

Descriptors: (*Technical information centers, Effectiveness), (*Data processing systems, Reports), Scientific personnel, Engineering personnel, Data storage systems, Dissemination, Magnetic recording systems, Phogotraphic recording systems

A model of method for scientific communication is discussed. The equipment and techniques which are being developed in an effort to handle information more effectively are discussed in the light of present and future input, storage, and output devices. (Author)

AD-627 565 See Fld. 20/1

AD-627 708 See Fld. 5/9

5/3. ECONOMICS

AD-627 880 Fld. 5/3
CFSTI Prices: HC $5.00 MF $1.00
DEPARTMENT OF THE NAVY WASHINGTON D C
ECONOMIC STRUCTURE OF THE SOVIET FISHING INDUSTRY (EKONOMIKA RYBNOI PROMYSHLENNOSTI SSR),
by S. V. Mikhaylov. 1963, 163p. Rept. no. Translation-935
TT 66-60489
Unclassified report

Trans. of mono. Pishchepromizdat, Moscow 1962.

Descriptors: (*Fishes, Industries), (*Industries, Economics), USSR

AD-627 313 See Fld. 5/4

AD-627 327 See Fld. 5/1

5/4. HISTORY, LAW AND POLITICAL SCIENCE

AD-627 313 Fld. 5/4, 5/3
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
PROJECT VERSUS PROGRAM AID: FROM THE DONOR'S VIEWPOINT,
by Alan Carlin. Dec 65, 16p. Rept. no. P-3283
Unclassified report

Descriptors: (*Foreign aid, Analysis), Economics, India, USSR, United States Government

The object of the paper is to determine considerations that a rational donor should weigh in deciding whether project or program economic assistance is more advantageous. Project aid is defined as assistance whose disbursement is tied to capital investment in a separate productive activity. Program aid is assistance whose disbursement is tied to the recipients' expenditures on a variety of items justified in terms of the total needs and development plan of the country rather than on any particular project. The conclusion is much the same as that of H. W. Singer ('External aid: for plans or projects'. Economical Journal, v. 75, no. 299, Sept. 1965, p. 539-545), that there is something to be said on both sides. However, it may be advisable to pursue a project approach in one case, a program in another, and some combination in still others.

AD-627 389 Fld. 5/4, 12/1, 15/5, 17/10
CFSTI Prices: HC $1.00 MF $0.50
STANFORD UNIV CALIF DEPT OF STATISTICS
STATISTICAL APPLICATIONS IN ARMS CONTROL INSPECTION.
Technical rept.,
by Herbert Solomon. 20 Dec 65, 19p. Rept. no. TR-113
Contract Nonr-225 (52) Proj. NR-342-022
Unclassified report

Descriptors: (*Arms control, Statistical analysis), (*Statistical analysis, Arms control), (*Seismic waves, Detection), Probability, Mathematical models, Feasibility studies

Several statistical techniques appropriate for problems arising in arms control inspection are presented and discussed. A major portion of the paper is devoted to methodology for detection of seismic shocks. Also discussed is an interesting model developed by Saaty by which different levels of arms between opponents can be described, thus permitting a mathematization of transition rules to obtain equilibrium states and, as a consequence, arms reduction. Some work of others is given brief attention. (Author)

AD-627 847 Fld. 5/4
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
A GENERAL AND THE APPARATCHIKS,
by Roman Kolkowicz. Jan 66, 9p. Rept. no. P-3298
Unclassified report

Descriptors: (*Political science, USSR), Communism, Government (Foreign), Military personnel, Public relations

Party-military relations in the Soviet Union is explored.

5/5. HUMAN FACTORS ENGINEERING

AD-627 570 Fld. 5/5, 5/8, 5/9
CFSTI Prices: HC $3.00 MF $0.75
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
THE DESIGN OF A FACILITY FOR THE MEASUREMENT OF HUMAN PILOT DYNAMICS.
Technical note,
by Lloyd Reid. Jun 65, 68p. Rept. no. UTIAS-TN-95
Contract AF-AFOSR-222-64
Unclassified report

Descriptors: (*Human engineering, Flight simulators), (*Flight simulators, Human engineering), Man-machine systems, Mathematical analysis, Laboratory equipment

The report describes the modification of the UTIAS CF-100 flight simulator and the development of a data analysis technique in order to study human operators in a realistic flight environment. The operator forms part of a closed loop system which may consist of one or two degrees of freedom. A method of analyzing data obtained from short record runs is presented which is similar to the well known cross-correlation, cross-power spectral density method. (Author)

AD-627 702 Fld. 5/5, 1/4
CFSTI Prices: HC $2.00 MF $0.50
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
EFFECTS OF VISUAL FIXATION AND UNCERTAINTY ON CONTROL PANEL LAYOUT.
Final rept., May 63-Dec 64,
by Donald A. Topmiller, and Earl D. Sharp. Oct 65, 37p. Rept. no. AMRL-TR-65-149
Proj. AF-7184 Task 718402
Unclassified report

Descriptors: (*Human engineering, Control panels), (*Control panels, Human engineering), (*Cockpits, Control panels), Display systems, Reaction (Psychology), Response, Reflexes, Time studies, Vision, Uncertainty, Pilots, Anthropometry, Perception (Psychology), Performance (Human), Motor reactions, Analysis of variance

Seated subjects reached to and operated 12 toggle switch controls located 31, 41, and 51 inches above the floor and 0, 25, 50, and 75 degrees to the left of the mid-sagittal plane. The effects on reaction time, reach time, and total response time of three-variables--control location, visual fixation/uncertainty, and anthropometric size of subjects--were investigated. Analyses of variance indicate that control location and visual fixation/uncertainty affect reaction, reach, and total response time; but body size does not. Derived scores were also analyzed to permit detailed examination of the perceptual-motor components of the response scores. The linear relationships between reach rate and reach distance observed in this study are compared with the curvilinear relationships reported in micromotion literature. To aid in evaluating control arrangements, response-time isograms are presented. (Author)

AD-627 671 See Fld. 5/8

AD-627 817 See Fld. 19/3

AD-627 818 See Fld. 19/3

AD-627 819 See Fld. 19/3

AD-627 820 See Fld. 19/3

AD-627 821 See Fld. 19/3

5/7. LINGUISTICS

AD-627 763 Fld. 5/7
CFSTI Prices: HC $5.00 MF $1.00
BUNKER-RAMO CORP CANOGA PARK CALIF
FULCRUM TECHNIQUE FOR CHINESE-ENGLISH MACHINE TRANSLATION.
Final rept. 1 Jul 64-30 Jun 65,
by Paul L. Garvin. Jan 66, 177p. Contract AF30 (602)-3462 Proj. AF-4599
RADC TR-65-340
Unclassified report

Descriptors: (*Machine translation, Chinese language), (*Chinese language, Machine translation), (*English language, Machine translation), Algorithms, Grammars, Syntax, Semantics, Transformational grammars

The purpose of this work was to study the application of the 'fulcrum technique' to Chinese-English machine aided translation, preparatory to the development of an ultimate capability for automatic translation from Chinese into English. The report covers (1) syntactic-semantic analysis of Chinese, including the study of Chinese grammar and the development of a syntactic recognition routine, and (2) synthesis of English output based on specifier of Chinese input, including transformation techniques for word order re-arrangement. Chinese analysis includes a general outline of the approach to Chinese grammar and an overall design of a recognition routine. English synthesis includes general principles of producing a translation, and a survey of the different aspects of translation to which various output production techniques are applicable. (Author)

AD-627 789 Fld. 5/7
CFSTI Prices: HC $2.00 MF $0.50
LINGUISTICS RESEARCH CENTER UNIV OF TEXAS AUSTIN
AN EXPERIMENT IN SEMANTIC CLASSIFICATION,
by Barry Forman. Dec 65, 27p. Rept. no. LRC-65-WT-3
Contract NSF-GN-308
Unclassified report

Descriptors: (*Semantics, Classification), (*Computational linguistics, Classification), Automatic, Programming (Computers)

A series of programs enabling a computer to generate a set of questions from a set of sentences by a process of generalization is described in this paper. The process involves an automatic classification of auguments and relations. (Author)

AD-627 790 Fld. 5/7
CFSTI Prices: HC $2.00 MF $0.50
LINGUISTICS RESEARCH CENTER UNIV OF TEXAS AUSTIN
AUTOMATIC LINGUISTIC CLASSIFICATION,
by Eugene D. Pendergraft. Nov 65, 52p. Rept. no. LRC-65-WAT-1
Contract DA-36-039-AMC-02162(E), NSF-GN-308
Unclassified report

See also PB-168 136.

Descriptors: (*English language, Classification), (*Computational linguistics, Classification), (*Classification, Automatic), Syntax, Semantics

The work plan of a long-range series of experiments in automatic linguistic classification is described, together with discussion of a first experiment. The latter is concerned with category identification. In particular, the data resulting from automatic syntactic analysis of English were used to identify syntactical categories which have similar membership. The series of experiments will accordingly combine the use of automatic linguistic analysis and automatic classification techniques. Automatic syntactic analysis, and in later experiments semantic analysis, will be performed within the Linguistics Research System. Automatic classification will be carried out within the Automatic Classification System. Both of these computer systems have been developed by the Linguistics Research Center. A programming interrface is being constructed between the two systems so that their combined capabilities can be used for automatic linguistic classification and partial self-organization. (Author)

AD-627 791 See Fld. 5/2

5/8. MAN-MACHINE RELATIONS

AD-627 671 Fld. 5/8, 5/5, 17/8
CFSTI Prices: HC $6.00 MF $1.25
NORTH AMERICAN AVIATION INC COLUMBUS OHIO
EFFECTS OF DISPLAY QUICKENING ON HUMAN TRANSFER FUNCTIONS DURING A DUAL-AXIS COMPENSATORY TRACKING TASK.
Final rept. May 63-Jun 64,
by Angelo P. Verdi, George N. Ornstein, Richard P. Heydorn, and George Frost. Nov 65, 220p. Contract AF33 (657)-11102 Proj. AF-7184
Task 718402
AMRL TR-65-174
Unclassified report

Descriptors: (*Man-machine systems, Tracking), (*Tracking, Performance (Human)), (*Transfer of training, Tracking), Display systems, Human engineering, Pilots, Motor reactions, Behavior, Response, Learning, Errors, Control systems, Functions, Reaction (Psychology), Reflexes, Feedback, Differential equations, Tables, Graphics, Mechanical drawings

The research was concerned with the human's behavior in adapting his response mode to variations of certain conditions of a compensatory tracking task. The task conditions evaluated were quickening level, system gain, task load, and task complexity. The results of the studies show good agreement with the transfer function 'adjustment rules' developed by other investigators. When quickening is introduced, the human adjusts his transfer function in a systematic and predictable manner in response to variations of the quickening level. As the amount of quickening increases the operator increases gain and lag but decreases lead. The human adjusts his equalizing parameters to achieve stable loop performance for all quickening levels. Man's ability to reduce the system error is significantly affected by the distribution of gains in the overall man-machine system. The human's transfer function for single and dual task load conditions probably differs. Tracking error was found to be least when the quickening level used in the second axis is identical to that in the axis of primary interest; error increased as the quickening levels for the two axes became more dissimilar. (Author)

AD-627 326 See Fld. 5/9

AD-627 570 See Fld. 5/5

5/9. PERSONNEL SELECTION, TRAINING AND EVALUATION

AD-627 326 Fld. 5/9, 15/5, 5/8
CFSTI Prices: HC $3.00 MF $0.75
PERSONNEL RESEARCH CENTER INC DETROIT MICH
PROCEDURES FOR GUIDANCE AND REVIEW OF PRIME CONTRACTOR DEVELOPMENT OF PERSONNEL PLANNING INFORMATION.
Technical rept.,
by V. Owen Wayman. Dec 65, 69p. Rept. no. TR-356 ,PTB-66-2
Contract Nonr-3949 (00)
Unclassified report

Descriptors: (*Naval equipment, Manpower studies), (*Manpower studies, Naval equipment), (*Government procurement, Military requirements), Personnel management, Man-machine systems, Management engineering, Maintenance

The guidelines for Bureau of Naval Personnel guidance and review of hardware contractor development of Personnel Planning Information presented in this report support the recommendations of the Bureau of Naval Personnel New Developments Human Factors Program. The guidance and review procedures have been designed for application to weapon and support systems in the RDT and E cycle under certain circumstances in which hardware contractor development of Personnel Planning Information would best meet the requirements of the Bureau of Naval Personnel. This report will be subsumed by the revision of the Bureau of Naval Personnel New Developments Human Factors Program which is currently in progress and is scheduled for completion by June 1966. (Author)

AD-627 330 Fld. 5/9
CFSTI Prices: HC $4.00 MF $1.00
MCCLELLAN (ROBERT B) CANOGA PARK CALIF
TASK-ANALYTIC METHODS APPLIED TO STAFFING CRITERIA FOR CONSTRUCTION INSPECTORS. VOLUME II. APPENDIX.
Final rept. 20 Apr-1 Dec 65,
by Robert B. McClellan. Dec 65, 147p. Contract NBy-62172
CR 65.003
Unclassified report

See also AD-627 599.

Descriptors: (*Personnel management, Job analysis), (*Construction, Naval shore establishments), Government employees, Manpower studies, Operations research, Specifications, Human engineering, Costs

An operations research study was undertaken to use a task-analytic approach to establish criteria for the Bureau of Yards and Docks Personnel staffing, required for the inspection of Naval shore establishment construction projects. Staffing criteria based on dollars work in place by construction type are presented with supporting documentation. Leveled inspection hours per thousand dollars work in place are presented for use in all Naval Districts. Allowed inspection hours are presented for the 11th Naval District. (Author)

AD-627 375 Fld. 5/9
CFSTI Prices: HC $3.00 MF $0.75
NAVAL PERSONNEL RESEARCH ACTIVITY SAN DIEGO CALIF
TRAINING, UTILIZATION, AND PROFICIENCY OF DATA SYSTEMS TECHNICIANS.
Technical bulletin,
by Chester R. Bilinski, and Lloyd S. Standlee.
Jan 66, 76p. Rept. no. STB-66-19
Proj. PF017030302
Unclassified report

Descriptors: (*Naval training, Data processing systems), (*Data processing systems, Technicians), Naval personnel, Statistical data, Tests, Performance (Human), Job analysis, Performance tests, Personnel management, Tables

A survey was made of 114 Data Systems Technicians (DS's) who were assigned to activities and ships in the western United States and Pacific. Most of the DS's had converted from other ratings. The data were gathered by means of records searches, written and performance tests, rating scales, and work check lists and diaries. The DS's were found to be working on a wide variety of tasks within their rating but at any one particular task only infrequently. Some areas of weakness were found in mathematics, in electronics fundamentals, and in the use of test equipment. In general, though, the DS's were performing their maintenance duties at a relatively high level of proficiency. (Author)

AD-627 539 Fld. 5/9, 5/10
CFSTI Prices: HC $2.00 MF $0.50
ARMY PERSONNEL RESEARCH OFFICE WASHINGTON D C
DEVELOPMENT OF A SELECTION BATTERY FOR ARMY IMAGE INTERPRETERS.
Technical research rept.,
by Harold Martinek, Rober Sadacca, and Laverne K.Burke. Oct 65, 43p. Rept. no. TRR-1143
Proj. DA-2J02471A723

Unclassified report

Descriptors: (*Photointerpreters, Selection), (*Psychometrics, Army personnel), Army training, Aerial reconnaissance, Effectiveness, Aptitude tests, Army personnel

The report concerns research to identify among prospective image interpreter trainees those with the necessary aptitude and abilities to achieve competence as image interpreters. Experimental measures were administered to over 200 officers and 65 enlisted trainees at entrance into the Image Interpreter Training Course conducted at the Army Intelligence School. Tests were evaluated for effectiveness in measuring potential for image interpretation using two yardsticks of training success--final course grade and end-of-course performance on practical exercises simulating intelligence requirements for information extraction from aerial surveillance imagery. A two-test battery consisting of an Image Orientation Test and an Image Interpretation Information Test was developed for Officer trainee selection. The Information test was made up of questions on general science, image interpretation, tactics, photography, and earth sciences. The General Technical Aptitude Area (GT), based on the Verbal and Arithmetic Reasoning tests of the Army Classification Battery, was the most effective selector for enlisted trainees. (Author)

AD-627 599 Fld. 5/9
CFSTI Prices: HC $3.00 MF $0.75
MCCLELLAN (ROBERT B) CANOGA PARK CALIF
TASK-ANALYTIC METHODS APPLIED TO STAFFING CRITERIA FOR CONSTRUCTION INSPECTORS. VOLUME I. REPORT TEXT.
Final rept. 20 Apr-1 Dec 65,
by Robert B. McClellan. Dec 65, 69p. Contract NBy-62172
CR 65.002-Vol-1

Unclassified report

Descriptors: (*Personnel management, Job analysis), (*Construction, Naval shore establishments), Government employees, Manpower studies, Operations research, Specifications, Costs, Human engineering

An operations research study was undertaken to use a task-analytic approach to establish criteria for the Bureau of Yards and Docks Personnel staffing, required for the inspection of Naval shore establishment construction projects. Staffing criteria based on dollars work in place by construction type are presented with supporting documentation. Leveled inspection hours per thousand dollars work in place are presented for use in all Naval Districts. Allowed inspection hours are presented for the 11th Naval District. (Author)

AD-627 651 Fld. 5/9, 5/10
CFSTI Prices: HC $3.00 MF $0.75
PERSONNEL RESEARCH LAB (6570TH) AEROSPACE MEDICAL DIV LACKLAND AFB TEX
A MULTIPLE LINEAR REGRESSION ANALYSIS OF OFFICER CAREER ATTITUDES,
by Lyde D. Kaapke, Ernest C. Tupes, and Ray W. Alvord. Oct 65, 93p. Rept. no. PRL-TR-65-16 Proj. AF-7719 Task 771904

Descriptors: (*Air force personnel, Attitudes), (*Attitudes, Officer personnel), Statistical analysis, Sociometrics, Personnel management

A survey covering demographic, sociological, and attitudinal information was completed by a random sample of 5,000 junior Air Force officers. Their responses were evaluated in terms of their relationship to a criterion of expressed career intention. Multiple linear regression analyses were used to measure the unique contribution to prediction of some of the survey items beyond that provided by certain 'baseline' variables believed to predict career intent. A second analysis was completed on a subsample of officers grouped by source of commission and subdivided by length of commissioned service, regular or reserve status, nonrated or rated flying status, and science-engineering or nonscience and nonengineering groupings. Data illustrate that career intent can be more meaningfully evaluated in terms of membership variables than by gross source of commission grouping normally employed. Six survey items offered the greatest unique contribution to the prediction of the criterion: (1) family attitude toward an Air Force career; (2) factors influencing for and against a career, (3) effect of the offer of a regular commission; (4) challenge of the Air Force job versus a civilian job; (5) the importance and possibility of achieving certain incentives and rewards as part of an Air Force career; and (6) the officers' feelings about frequent change of residence. (Author)

AD-627 708 Fld. 5/9, 5/2
CFSTI Prices: HC $1.00 MF $0.50
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF
MATHEMATICS. A SELECTED LIST OF MATERIALS IN THE LIBRARY OF THE U. S. NAVAL POSTGRADUATE SCHOOL COMPILED AS A GUIDE TO FACILITATE THE USE OF THE COLLECTION.
Technical rept.,
by E. R. Larson. Jan 66, 13p. Rept. no. RP-58

Unclassified report

Descriptors: (*Navy, Education), (*Libraries, Mathematics), (*Mathematics, Libraries), Textbooks, Handbooks, Periodicals, Abstracts, Indexes

The bibliography is intended as a guide to the collection of the U. S. Naval Postgraduate School Library in the field of mathematics. It is not a comprehensive listing of such material but is highly selective and reflects the holdings of the library. In many cases the publications listed are representative of other materials also in the School Library. (Author)

AD-627 709 Fld. 5/9, 5/1
CFSTI Prices: HC $4.00 MF $0.75
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF
ABSTRACTS OF DISSERTATIONS, THESES AND RESEARCH PAPERS SUBMITTED BY CANDIDATES FOR DEGREES, 1964-1965.
Annual rept.
13 Dec 65, 116p.

Unclassified report

See also AD-420 625.

Descriptors: (*Abstracts, Scientific research), (*Scientific research, Abstracts), (*Navy, Education), Engineering, Chemistry, Mechanical engineering, Physics, Meteorology, Management engineering, Electrical engineering, Operations research

AD-627 844 Fld. 5/9, 5/10
CFSTI Prices: HC $1.00 MF $0.50
NAVAL PERSONNEL RESEARCH ACTIVITY SAN DIEGO CALIF
DEVELOPMENT AND PRELIMINARY EVALUATION OF THE U. S. NAVY AUTOMOTIVE KNOWLEDGE TEST.
Technical bulletin,
by Leonard Swanson. Jan 66, 22p. Rept. no. STB-66-20
Proj. PF016050101

Unclassified report

Descriptors: (*Naval personnel, Selection), (*Achievement tests, Test construction (Psychology)), Vehicles, Maintenance, Personnel management, Reliability

The purpose of this study was the development and preliminary evaluation of an automotive information test for possible use in assigning personnel to selected mechanical schools. A brief (35-item) Automotive Knowledge Test (AKT) was developed. This test, with a reliability of .89, appeared to measure the same factors as the USN Mechanical Test (MECH) of the Basic Battery, since the correlation between AKT and MECH was .76 and the pattern of correlations with other basic battery tests was similar. A 23-item key for the AKT was as valid as the 100-item MECH for predicting grades in five of six schools studied. It is recommended that the AKT be included in an extensive program of short test evaluation which should be undertaken at all Navy schools after automated test processing equipment becomes available. (Author)

AD-627 987 Fld. 5/9
CFSTI Prices: HC $3.00 MF $0.50
NAVAL PERSONNEL RESEARCH ACTIVITY SAN DIEGO CALIF
PROFICIENCY OF BASIC SONAR MAINTENANCE TRAINEES IN THE USE OF COMMON TEST EQUIPMENT.
Research rept.,
by Joseph Branks. Jan 66, 56p. Rept. no. SRR-66-14
Proj. PF017030108

Unclassified report

Descriptors: (*Sonar personnel, Performance tests), (*Maintenance personnel, Training), (*Training, Test equipment (Electronics)), Students, Electronic equipment, Operation

During July of 1965, fifty-eight students in the Basic Surface Sonarman Course at the Fleet Anti-Submarine Warfare (ASW) School, San Diego, were tested on their use of basic electronic test equipment. All were tested at the completion of the ten-week maintenance phase of the course. Two diagnostic tests were administered which were designed to identify the specific procedural errors accounting for inaccurate measurements. One test was a replication of a test given to students at the ASW School on three other occasions; its readministration allowed a comparison of the current students to the groups tested previously. The other test was designed to meet the current needs of the ASW School; it provided more detailed diagnostic information. The results indicated that the current students performed better than the previous groups. This improvement is attributed to course changes which emphasize the practical use of test equipment. In addition, a number of common procedural errors in the use of test equipment were identified. (Author)

AD-627 570 See Fld. 5/5

AD-627 590 See Fld. 5/10

5/10. PSYCHOLOGY (INDIVIDUAL AND GROUP BEHAVIOR)

AD-627 358 Fld. 5/10
CFSTI Prices: HC $1.00 MF $0.50
ILLINOIS UNIV URBANA GROUP EFFECTIVENESS RESEARCH LAB
AN EXPLORATORY STUDY OF INTER-CULTURAL NEGOTIATIONS.
Technical rept.,
by Earl E. Davis, and Harry C. Triandis. Nov 65, 5p. Rept. no. TR-26
Contract Nonr-1834 (36) Proj. NR-177-472
Unclassified report

Descriptors: (*Culture, Social psychology), (*Social psychology, Behavior), Attitudes, Perception (Psychology), Sociometrics

The report contains two main sections: Part One presents a theoretical framework developed initially by Triandis, which has been expanded into a conceptual framework useful for the description of negotiations in culturally heterogeneous groups. Part Two of the monograph describes in detail the methodology and results of an empirical study designed to explore the relationships among some of the variables in the conceptual framework, and discusses the implications of this study for future research.

AD-627 359 Fld. 5/10
CFSTI Prices: HC $1.00 MF $0.50
ILLINOIS UNIV URBANA GROUP EFFECTIVENESS RESEARCH LAB
THE EFFECT OF STRESS ON THE CONTRIBUTION OF MEMBER INTELLIGENCE TO GROUP CREATIVITY.
Technical rept.,
by Fred E. Fiedler, and W. A. T. Meuwese. Jan 66, 18p. Rept. no. TR-29
Contract Nonr-1834 (36) ,ARPA Order-454 Proj. NR-177-472
Unclassified report

Descriptors: (*Leadership, Group dynamics), (*Group dynamics, Stress (Psychology)), Psychometrics, Problem solving, Performance (Human), Anxiety, Social psychology, Correlation techniques

The study investigates the relation between leader and member intelligence under three conditions of experimentally created stress, and under varying degrees of leader anxiety. The results indicate that the leader's intelligence correlates with (that is, contributes to) group performance primarily in situations which are relatively free of stress or when the leader's anxiety is low, while his members contribute to group performance primarily under anxious leaders or in situations which are stressful or anxiety arousing for the leader. (Author)

AD-627 360 Fld. 5/10
CFSTI Prices: HC $3.00 MF $0.75
ILLINOIS UNIV URBANA GROUP EFFECTIVENESS RESEARCH LAB
THE EFFECT OF CULTURAL HETEROGENEITY, LEADER POWER, AND LEADER ATTITUDES ON GROUP PERFORMANCE: A TEST OF THE CONTINGENCY MODEL.
Technical rept.,
by Fred E. Fiedler. Aug 65, 60p. Rept. no. TR-25
Contract Nonr-1834 (36) ,ARPA Order-454 Proj. NR-177-472 ,2870
Unclassified report

Descriptors: (*Leadership, Group dynamics), (*Group dynamics, Leadership), Attitudes, Culture, Performance (Human), Verbal behavior, Social communication, Perception (Psychology), Training, Effectiveness, Social psychology, Correlation techniques

An experiment was conducted (a) to compare the performance of 96 culturally and linguistically homogeneous and heterogeneous three-man teams under powerful and weak leadership positions and on three types of tasks varying in structure and requirements for verbal interaction, and (b) to test a previously described Contingency Model of Leadership Effectiveness. The experiment, conducted in collaboration with the Belgian Naval Forces, utilized 288 petty officers and men from a naval training center, who were assigned to 96 groups in a 16-cell design. Homocultural and heterocultural groups differed in performance only on the highly verbal task. Heterogeneous groups, despite obvious communication difficulties and culturally divergent background, performed about as well on the structured and non-verbal tasks as did homogeneous groups. Groups led by recruit leaders performed as well as groups directed by petty officers. Thus, neither the military leadership training and experience nor the position power of petty officers contributed to the effectiveness of these groups. These findings have considerable potential implications for leadership training programs and an evaluation of the communication variable in affecting group productivity. (Author)

AD-627 394 Fld. 5/10
CFSTI Prices: HC $3.00 MF $0.75
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
SHORT-TERM MEMORY: AN ANNOTATED BIBLIOGRAPHY.
Technical rept.,
by Donald Reynolds, and Richard D. Rosenblatt. Dec 65, 83p. Rept. no. HumRRO-TR-65-13
Contract DA-44-188-ARO-2 Proj. DA-2J024701A712-01
Unclassified report

Descriptors: (*Memory, Bibliographies), Information theory, Word association, Recall, Perception (Psychology), Learning, Reviews

The bibliography is divided into 12 areas as follows: (1) Information Theory; (2) Proactive and Retroactive Interference and Interpolated Activities; (3) Set, Subject-Strategies, and Coding Techniques; (4) Paired-Associate Studies; (5) Simultaneous Listening and Memory Span Studies; (6) Rate and Mode of Stimulus Presentation; (7) Rate and Order of Recall, and Serial and Sequential Tasks; (8) Methods, Theory, and Review Articles; (9) Meaningfulness, Degree of Learning, and Stimulus Organization; (10) Age Differences; (11) Comparisons of Short-Term Memory and Long-Term Memory; and (12) Perceptual Studies. There are 170 articles annotated in the bibliography and extensive cross-indexing to facilitate location of articles. Although the earliest study included is dated 1910, the majority of articles were published in the period from 1959 through 1964. (Author)

AD-627 400 Fld. 5/10
CFSTI Prices: HC $1.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
LEARNING CURVES FOR COLOR IDENTIFICATION,
by R. M. Hanes, and K. B. Hansen. 7 Nov 60, 10p. Rept. no. TG-384
Contract NOrd-7386
Unclassified report

Descriptors: (*Colors, Identification), (*Learning, Colors), Color vision, Visual perception, Performance tests

Observers can learn to identify 65 different color chips with less than 5 percent error in 40 to 55 hours of study when the chips are presented singly. With the stimulus materials used in the study (chips from the Munsell Student Set), two different distributions of the chips within the set produced essentially equivalent results. Presentation of more than one chip simultaneously, after prolonged study with single-chip presentation, had little effect on some observers but seemed to make the identification problem much more difficult for others. (Author)

AD-627 424 Fld. 5/10
MIAMI UNIV OXFORD OHIO
A MATHEMATICALLY DEFINED TASK FOR THE STUDY OF GROUP PERFORMANCE,
by Julian O. Morrissette, William H. Pearson, and S. A. Switzer. 1965, 10p. Contract AF 33 (657)-10456 Proj. AF-7184 Task 718403
AMRL TR-65-159
Unclassified report

Availability: Published in Human Relations v18 n2 p187-92 May 1965. Copies to DDC users only.

Descriptors: (*Mathematical models, Group dynamics), (*Group dynamics, Information theory), Performance (Human)

A task was developed for the purpose of studying group performance in communication nets. Characteristics of the task are: (a) an objective solution; (b) replicability with unique solutions, while task difficulty and workload may be kept quantitatively constant; (c) task difficulty and workload may be which may be varied independently; (d) group size variation, while task properties may be kept constant or varied; and (e) quantitatively described task elements such that the elements assigned to each group member may or may not be kept quantitatively equal. H, the Shannon-Wiener measure of information in a set of elements, was investigated as an indicator of task difficulty. Solution times linearly proportional to H were obtained. (Author)

AD-627 425 Fld. 5/10
MIAMI UNIV OXFORD OHIO
INDIVIDUAL PERFORMANCE IN COOPERATIVE AND INDEPENDENT GROUPS,
by Clarke W. Crannell, S. A. Switzer, and Julian O. Morrissette. 16 Sep 63, 10p. Contract AF 33 (616)-7132 Proj. AF-7184 Task 718403
AMRL TR-65-219
Unclassified report

Availability: Published in The Journal of General Psychology, v73 p231-6 1965. Copies to DDC users only.

Descriptors: (*Group dynamics, Performance (Human)), (*Performance (Human), Group dynamics), Behavior, Learning, Recall, Reaction (Psychology), Errors, Analysis of variance

A recently reported investigation showed that, in a learning task involving the recall of 100 three-digit numbers, five-man cooperative (interacting) groups recalled significantly fewer items correctly than did fiveman independent (noninteracting) groups. However, the cooperative groups reported significantly fewer items incorrectly than did the independent groups. In terms of the total number of items recalled, the cooperative groups (as compared with the independent groups) had a much larger proportion of correct responses. The objective of this investigation is to determine the effects of interaction and noninteraction on internal group processes, thereby providing a basis for a better understanding of group performance. We shall attempt to accomplish this objective by analyzing the performance of the best Ss and the poorest Ss in each group. (Author)

AD-627 427 Fld. 5/10
CFSTI Prices: HC $1.00 MF $0.50
HUNTER COLL OF THE CITY UNIV OF NEW YORK
EFFECTS OF SOURCE ON EXPRESSED COGNITIVE SUPPORT FOR AN OPPOSING POSITION.
Technical rept.,
by Walter Weiss. Dec 65, 15p. Rept. no. TR-5
Contract Nonr-4309 (00) Proj. RR-006-08-02
Unclassified report

Descriptors: (*Attitudes, Social communication), (*Social communication, Attitudes),

Decision making, Performance (Human), Social psychology

The principal purpose was to determine if the communicator of an opposing point of view would differentially affect the variety or kinds of reasons that people offer in defense of their own attitudes on an issue. Ss (240 college students) gave reasons supporting their own viewpoints on each of three topics, after being informed of the opinion position of a high prestige or a low prestige or an anonymous source on each topic. Half of the Ss responded to one set of three topics and half to another set. Although the kinds of attitude-supporting reasons offered by the Ss were not significantly affected by the assigned sources, the numbers of such reasons were reduced when the sources were the more favorably regarded ones. However, regard for these sources was diminished, apparently owing to their advocacy of viewpoints opposing those held by most of the Ss. A similar effect was not found for the less well regarded sources. (Author)

AD-627 437 Fld. 5/10
CFSTI Prices: HC $2.00 MF $0.50
WASHINGTON UNIV SEATTLE
INSTRUCTIONS AND THE SIMPLEX IN PERSONALITY ASSESSMENT.
by Bruce M. Bloxom. Jan 66, 37p. Contract Nonr-477 (33) ,PHS-MH-743-08
Unclassified report

Descriptors: (*Personality, Measurement), (*Psychometrics, Test construction (Psychology)), (*Test construction (Psychology), Psychometrics), Factor analysis, Statistical functions, Correlation techniques

The report reviews previous research on instructions used to administer personality measures. The main finding is that most of this research has been focused on what can be manipulated by instructions, not on what it is in the instructions that does the manipulation. The report also reviews attempts to deal with the problem of the simplex (or Guttman scale) as it affects the factor analysis of personality measures. The principal finding is that there is presently no completely satisfactory method for taking the simplex into account in a multi-dimensional factor analysis. The report develops a method, and corresponding rationale, for the comparison of factor analytic results obtained under different instructions. The method can be applied, whether or not the simplex is taken into account in the factor analyses. (Author)

AD-627 440 Fld. 5/10
CFSTI Prices: HC $3.00 MF $0.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
DATING HUMAN MEMORIES BY HYPNOSIS,
by J. W. Gebhard. 1965, 69p. Rept. no. TG-361 Contract NOrd-7386
Unclassified report

Descriptors: (*Hypnosis, Memory), (*Memory, Hypnosis), Recall, Aging (Physiology), Nervous system, Physiology, Recall, Electroencephalography, Convulsive disorders, Intelligence tests, Performance tests, Projective techniques, Psychometrics, Verbal behavior, Word association, Conditioned reflex, Reaction (Psychology), Behavior, Personality, Abnormal psychology

Contents: Hypnotic recovery of memory: method; basic problem; physiological studies on old neural mechanisms; psychological studies on old neural mechanisms. Normal recall; hypnotic recall; validity of hypnotic regression.

AD-627 449 Fld. 5/10
CFSTI Prices: HC $2.00 MF $0.50
STATE UNIV OF NEW YORK BUFFALO
SOME CURRENT ISSUES IN THE PSYCHOLOGY OF CONFORMITY AND NONCONFORMITY.
Technical rept.,
by Edwin P. Hollander, and Richard H. Wilis. Jan 66, 33p. Rept. no. TR-2
Contract Nonr-4679 (00) Proj. NR-177-269
Unclassified report

Descriptors: (*Social psychology, Behavior), (*Behavior, Social psychology), Reaction (Psychology), Group dynamics, Perception (Psychology), Personality, Attitudes, Motivation

The report covers some current issues central to the conception and study of conformity as an influence process. It urges a rectification of the imbalance created by an emphasis on conformity at the expense of nonconformity. Both kinds of responses are considered to have various properties which have value for the individual. Moreover, a further distinction is presented between movement conformity and congruence conformity in terms of responses to present versus past influence pressures. Though conformity and nonconformity have traditionally been treated as the opposite ends of a single dimension, a two-dimensional model is viewed as more appropriate to the actual response alternatives available to the individual when faced with an assertion of influence. (Author)

AD-627 580 Fld. 5/10
STATE UNIV OF NEW YORK BUFFALO
CONFORMITY PROCESS AND PRIOR GROUP SUPPORT.
Technical rept.,
by E. P. Hollander, James W. Julian, and Gordon A. Haaland. 17 May 65, 7p. Rept. no. TR-1
Contract Nonr-4679 (00) Proj. NR-177-269
Unclassified report

Presented at the 1965 Eastern Psychological Association Convention at Atlantic City, N. J.

Availability: Published in Journal of Personality and Social Psychology, v2 n6 p852-8 1965.

Descriptors: (*Social psychology, Behavior), (*Behavior, Social psychology), Attitudes, Group dynamics, Reaction (Psychology), Learning, Sex, Statistical analysis

A 2-phase experiment on conformity process was conducted with 76 women and 36 men. In same-sex groups, Ss were presented with 1 of 3 conditions of prior group support before confronting erroneous judgments apparently given by 4 other group members. In the 1st phase, Ss responded to an unambiguous stimulus for 20 trials as the 1st person to report in a standard Crutchfield situation. The 3 support conditions involved uniform agreement from the group on 20 out of 20 trials, 14 out of 20 trials, or 10 out of 20 trials; a control condition had no feedback from others. Ss then shifted to the usual last response position for 20 more trials on which it now appeared that the other group members were responding directly opposite to accurate perception of the same unambiguous stimulus. Initial and sequential conformity were found to differ significantly as a function of the 4 treatments. As predicted, total conformity and a postinteraction measure of dependence were significantly correlated. Sex differences in total conformity were also noted, with the women being significantly higher overall. (Author)

AD-627 588 Fld. 5/10
CFSTI Prices: HC $2.00 MF $0.50
ILLINOIS UNIV URBANA DEPT OF PSYCHOLOGY
GROUP AND ORGANIZATIONAL FACTORS INFLUENCING CREATIVITY.
Quarterly rept. amended to include communication, cooperation and negotation in culturally heterogeneous groups.
by Fred E. Fiedler, Lawrence M. Stolurow, and Harry C. Triandis. 31 Oct 65, 29p.
Contract Nonr-1834(36), ARPA Order 454
Unclassified report

Descriptors: (*Attitudes, Culture), (*Culture, Social psychology), (*Social psychology, Behavior), Sociology, Factor analysis, Social communication, Personality, Group dynamics, Creativity, Performance (Human), Programmed instruction, Leadership, Stress (Psychology), Industrial psychology, Training, Programming (Computers), United States, India, Greece

The strategy of this sub-project, is to develop procedures which tap significant features of the cognitive processes of individuals belonging to different cultures; to test the significance of differences in cognitive functioning across different cultures on the behavior of people who are operating in intercultural negotiation situations; to organize this information into meaningful wholes; and to feed the information that is important and relevant for effective behavior in intercultural situations to the researchers in sub-project II who will then place this information in culture assimilators.

AD-627 590 Fld. 5/10, 5/9
CFSTI Prices: HC $1.00 MF $0.50
COLORADO UNIV BOULDER
SOME SITUATIONAL AND COGNITIVE DETERMINANTS OF ROLE PLAYING: A REPLICATION AND AN EXTENSION)
Technical rept.,
by O. J. Harvey, and James A. Kline. 1965, 18p. Rept. no. TR-15
Contract Nonr-1147 (07)
Unclassified report

Descriptors: (*Social psychology, Behavior), (*Attitudes, Social psychology), Sociometrics, Stress (Psychology), Performance (Human), Creativity, Analysis of variance

In a study by Harvey (1963) representatives of each of the four principal conceptual systems posited by Harvey, Hunt and Schroder (1961) were required to construct and present either in public or in private arguments that ran counter to their own beliefs on the issue of whether or not philosophy should be required as a minor for all college undergraduates. The present study, in addition to its aim of providing predictors for performance of Peace Corps volunteers in training, sought to determine if the findings of Harvey would hold for a different issue and for arguments that were consonant with an individual's beliefs as well as for arguments that ran counter to his stand. To determine this generalizability, 174 Peace Corps trainees, classified into conceptual systems, were required to construct and present aloud arguments that were both in accord and contradiction with their beliefs about the American way of life. This condition approximates the public condition of the Harvey study. However, performance in the present study probably induced more stress because not only were the subjects playing the role in the presence of representatives of institutional authority, they had been led to believe that their remaining in the Peace Corps depended to some extent upon the battery of tests they were given, of which the role playing experiment was one.

AD-627 595 Fld. 5/10, 5/11
CFSTI Prices: HC $1.00 MF $0.50
SOCIAL SCIENCE RESEARCH COUNCIL NEW YORK
FOREIGN SYMPOSIA ON SOCIAL PSYCHOLOGICAL RESEARCH.
Final rept. 1 Jun 63-16 Nov 65,
by Paul Webbink. 17 Nov 65, 6p. Contract Nonr-4210 (00)
Unclassified report

Descriptors: (*Social psychology, Sympsoia), Professional personnel, Scientific organizations, Scientific research, Social sciences, Training

Two conferences of European social psychologists and a small number of United States social psychologists, to exchange information on current research, to share views regarding future research,

and to bring about closer relationships among European psychologists, were held --in December 1963 at Sorrento, Italy, and in December 1964 at Frascati, Italy. A technical report (Technical Report No. 1) on the 1963 conference has been prepared and distributed by Dr. John Lanzetta, and a technical report on the December 1964 conference is in preparation. In addition to the direct intellectual gains produced by the conferences, discussions at the conferences have led to the formation of a European Association for the Advancement of Social Psychology. The Association in cooperation with the Committee on Transnational Social Psychology of the Social Science Research Council is planning a summer training institute for European social psychologists to be held in Belgium in 1966, following a similar summer school held at the Hague in 1965, and the European Association is planning a third conference of European social psychologists to be held in France in 1966. (Author)

AD-627 596 Fld. 5/10
CFSTI Prices: HC $1.00 MF $0.50
BUCKNELL UNIV LEWISBURG PA DEPT OF PSYCHOLOGY
FEAR OF FAILURE AND GENERAL ACHIEVEMENT BEHAVIOR.
Annual rept.
Nov 65, 12p. Contract Nonr-3591 (01) Proj. NR-171-803

Unclassified report

Descriptors: (*Fear, Psychometrics), Theory, Achievement tests, Perception (Psychology), Behavior

The report concerns (1) The validation and exploration of the Hostile Press (HP) scoring system for fear of failure and, (2) the development and testing of a General Theory of Achievement Behavior.

AD-627 754 Fld. 5/10, 6/3
UNIVERSITY COLL LONDON (ENGLAND) DEPT OF ANATOMY
TWO MEMORY STORES IN ONE BRAIN,
by J. Z. Young. 1964, 8p. Contract AF-EOAR-2-63
AFOSR 65-2514

Unclassified report

Availability: Published in Endeavor p13-20 Jan 1965. Copies to DDC users only.

Descriptors: (*Cephalopoda, Learning), (*Memory, Cephalopoda), (*Learning, Cephalopoda), Touch, Vision, Great Britain

The octopus brain has two almost separate stores, one for visual and the other for tactile information. Besides the lobes that carry the actual record, there are others concerned with reading-in or reading-out from the stores. The work is part of a broader study of learning.

AD-627 758 Fld. 5/10
HOFSTRA UNIV HEMPSTEAD N Y DEPT OF PSYCHOLOGY
WHAT IS AN EMOTION,
by Robert Plutchik. 17 Nov 65, 9p. Contract Nonr-2252 (01)

Unclassified report

Availability: Published in The Journal of Psychology v61 p295-303 1965. Copies to DDC users only.

Descriptors: (*Emotions, Theory), Personality, Reaction (Psychology), Psychometrics

The theory of emotion stemmed from a biological, evolutionary background. It conceives of emotions as adaptive reactions to events in the life of the individual. It assumes that there are only a small number of primary emotions and that all others may be conceived as mixtures of these primary ones. The basic or 'prototype' emotions may be conceptualized in general, ethological terms, so that they may be used to describe not only the behavior of human adults but of lower animals as well. The theory has considerable value in stimulating research, and three recent studies are described. One was concerned with the analysis of diagnostic constructs, a second with the development of an Index to measure emotions in human adults, and a third with a reliable technique for evaluating affect in early memories. The theory also suggests certain possibilities in connection with the evaluation of psychosomatic symptoms. (Author)

AD-627 794 Fld. 5/10
CFSTI Prices: HC $1.00 MF $0.50
ILLINOIS UNIV URBANA GROUP EFFECTIVENESS RESEARCH LAB
INTERPERSONAL PERCEPTION AND PSYCHOLOGICAL ADJUSTMENT OF GROUP MEMBERS.
Annual rept.
Jan 66, 13p. Contract DA-49-193-MD-2060

Unclassified report

Descriptors: (*Adjustment (Psychology), Group dynamics), (*Group dynamics, Military personnel), (*Perception (Psychology), Group dynamics), Culture

AD-627 863 Fld. 5/10
CFSTI Prices: HC $1.00 MF $0.50
EMORY UNIV ATLANTA GA
DISCUSSION PATTERNS OF HOMOGENEOUS GROUPS OF REPRESSERS AND SENSITIZERS FOLLOWING SUCCESS AND FAILURE,
by Richard N. Carrera, and Arthur M. Cohen. 1965, 24p. Contract Nonr-4252 (01) ,NSF-GS-501

Unclassified report

Descriptors: (*Group dynamics, Reaction (Psychology)), (*Anxiety, Reaction (Psychology)), Performance (Human), Personality, Social communication

The purpose of the study was to investigate some aspects of the interpersonal behavior of small, homogeneous groups of repressers and sensitizers who have been exposed to several instructional sets.

AD-627 894 Fld. 5/10, 6/5, 6/16
CFSTI Prices: HC $1.00 MF $0.50
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTRO-PHYSIOLOGIE PARIS (FRANCE)
NERVOUS PROCESSES UNDERLYING BEHAVIOR AND LEARNING.
Final scientific rept. 1 May 63-30 Apr 65,
by A. E. Fessard. 1965, 15p. Contract AF-EOAR-13-63
AFOSR 65-2721

Unclassified report

Descriptors: (*Nervous system, Behavior), (*Learning, Nervous system), Nerve cells, Physiology, Neurology, Brain, France, Abstracts, Animals

Abstracts are presented of research under the following general headings: animal behavior, cerebral physiology, and cellular processes.

AD-627 997 Fld. 5/10, 6/15
CFSTI Prices: HC $1.00 MF $0.50
CHEMICAL RESEARCH AND DEVELOPMENT LABS EDGEWOOD ARSENAL MD
THE EFFECT OF CHLORPROMAZINE AND AMPHETAMINE ON CONCEPTUAL DIFFERENTIATION.
Technical rept., Mar-Apr 65,
by James J. Hart. Sep 65, 18p. Rept. no. CRDLR-3311
Proj. DA-1C522301A079

Unclassified report

Descriptors: (*Chlorpromazine, Performance (Human)), (*Amphetamines, Performance (Human)), (*Sensory perception, Drugs), (*Performance (Human), Drugs), Performance tests, Psychometrics, Statistical analysis

The purpose of the studies was to determine if chlorpromazine and amphetamine have opposite effects on conceptual differentiation (the measure of an individual's mode of categorizing perceived similarities and differences). In the first experiment, 10 mg of amphetamine and 25 mg of chlorpromazine were administered orally to the subjects, each drug on a different day. During the expected peak reaction, the Object Sorting Test (OST), the selected measure of conceptual differentiation, was administered to the subjects in a group. It was predicted that in the OST amphetamine would result in the use of many groupings, while chlorpromazine would result in the use of relatively few groupings. The difference in number of groups used under either drug was not significant. In the second experiment, different subjects were tested in essentially the same manner but with the following modifications: (1) subjects were selected from the upper end of the General Technical Aptitude Area Test (GT) distribution, (2) the OST was administered individually with an inquiry period at the end, and (3) the dose of amphetamine was increased to 15 mg and chlorpromazine to 50 mg orally. These modifications resulted in less variability from subject to subject, but the difference in the number of groupings was, again, insignificant. The hypothesis that chlorpromazine would result in less groupings on the OST and amphetamine in more groupings was tested. Two tests were made of the hypothesis, and in both cases there were no significant differences between the number of groups sorted under the two drugs. (Author)

AD-627 340 See Fld. 6/16

AD-627 402 See Fld. 15/7

AD-627 411 See Fld. 15/7

AD-627 539 See Fld. 5/9

AD-627 594 See Fld. 6/3

AD-627 651 See Fld. 5/9

AD-627 827 See Fld. 6/3

AD-627 844 See Fld. 5/9

AD-628 041 See Fld. 6/19

5/11. SOCIOLOGY

AD-627 595 See Fld. 5/10

Field 6-BIOLOGICAL AND MEDICAL SCIENCES

6/1. BIOCHEMISTRY

AD-627 275 Fld. 6/1, 6/5
WALTER REED ARMY INST OF RESEARCH WASHINGTON D C DEPT OF GASTROENTEROLOGY
DISACCHARIDASE ACTIVITY IN NORMAL AND DISEASED SMALL BOWEL,
by Thomas W. Sheehy, and Pearl R. Anderson. 1965, 12p.

Unclassified report

Availability: Published in The Lancet p1-12 Jul 3 1965. Copies to DDC users only.

Descriptors: (*Gastrointestinal system, Glycoside hydrolases), (*Glycoside hydrolases, Gastrointestinal system), Diseases, Deficien-

cy diseases, Biopsy, Histological techniques, Disaccharides, Blood chemistry, Tolerances (Physiology), Test methods, Absorption (Biological), Adults

Peroral jejunal biopsy was successfully carried out on 92 of 108 adults as an outpatient procedure. Disaccharidase activity was measured in jejunal-mucosa specimens taken from 50 healthy active adults and 30 patients with gastrointestinal diseases. Like other disaccharidases, lactase activity has a wide range in the healthy adult. Lactase deficiency per se is apparently not as common as reported, but about 1 of every 6 healthy persons has a low concentration of the enzyme without manifest intolerance to lactose. Generalised disaccharidase deficiency is common in patients with diseases causing extensive damage to the small-bowel mucosa. The lactose-tolerance test was found to be a useful screening test for detecting generalised malabsorption. (Author)

AD-627 304 Fld. 6/1
CFSTI Prices: HC $1.00 MF $0.50
LOUISVILLE UNIV KY SCHOOL OF MEDICINE
STEROID-PROTEIN INTERACTIONS. XI. ELECTROPHORETIC CHARACTERIZATION OF CORTICOSTEROID-BINDING PROTEINS IN SERUM OF RAT, MAN AND OTHER SPECIES,
by Ulrich F. Westphal, and Frank De Venuto.
13 Sep 65, 25p. Proj. DA-3A014501B71P Task 3A014501B71P03
USAMRL 638

Unclassified report

See also AD-618 513.

Descriptors: (*Steroids, Chemical reactions), (*Proteins, Chemical reactions), (*Blood proteins, Electrophoresis), (*Corticosteroid agents, Blood serum), Globulins, Humans, Rats, Mammals, Serum albumin, Labelled substances

A study was undertaken to determine whether one or more serum protein component is responsible for the high-affinity binding of different corticosteroids and to characterize the corticosteroid-binding proteins of several mammalian sera. The highest binding affinity for cortiocosterone, cortisol or aldosterone was observed with the same electrophoretic fraction of human serum. Cortisol displaced aldosterone from its binding sites. In rat serum an electrophoretic component was responsible for high-affinity binding of corticosterone and cortisol. In the serum of rat and rabbit the alpha-1-globulin fraction showed the highest specific activity for corticosterone-4-C14 and cortisol-4-C14. For bovine and horse serum the highest binding affinity was associated with the alpha-globulin fraction. The high-affinity corticosteroid-binding proteins in several mammalian sera are thus alpha-globulins. Low pH values affect the migration of the corticosteroid-binding globulin of rat serum in the electrophoretic field as a prealbumin. (Author)

AD-627 339 Fld. 6/1, 6/13
ARMY MEDICAL RESEARCH LAB FORT KNOX KY BIOPHYSICS DIV
ULTRAVIOLET LIGHT INHIBITION OF GALACTOSIDE PERMEASE INDUCTION,
by Arnold S. Brownell, and Dorothy M. Witt. 13 Sep 65, 14p. Proj. DA-3A014501B71P Task DA-3A014501B71P-04
USAMRL 648

Unclassified report

Availability: Published in Biochemical and Biophysical Research Communications, v21 n2 p113-9 1965. Copies to DDC users only.

Descriptors: (*Escherichia coli, Ultraviolet radiation), (*Enzymes, Biosynthesis), (*Ultraviolet radiation, Enzymes), Enzyme inhibitors, Proteins, Cells (Biology)

At the population level, the induction of galactoside permease and beta-galactosidase synthesis by E. coli is inhibited to the same extent and in a progressive manner with increasing ultraviolet light dose. At the level of the individual cells, if the effect of the ultraviolet light is an all-or-none phenomenon, then both the permease and beta-galactosidase system must be affected simultaneously. The increase in the lag period of beta-galactosidase induction following ultraviolet light irradiation appears to be merely a reflection of an effect on protein synthesis in general and not a specific effect on this induction process. (Author)

AD-627 366 Fld. 6/1, 11/3
CFSTI Prices: HC $1.00 MF $0.50
ARMY MEDICAL RESEARCH LAB FORT KNOX KY
NON-ENZYMIC PRODUCTION OF SOLUBLE COLORED PRODUCTS FROM INSOLUBLE PROTEIN-DYE SUBSTRATES,
by Jesse L. Bobbitt, and Philip L. Luster. 30 Sep 65, 22p. Rept. no. USAMRL-641
Proj. DA-3A014501B71P

Unclassified report

Descriptors: (*Peptide hydrolases, Biological assay), (*Biological assay, Dyes), (*Dyes, Complex compounds), (*Biological stains, Peptide hydrolases), (*Proteins, Biological stains), Serum albumin, Colors, Absorption spectrum, pH, Trypsin

Insoluble protein-dye complexes, such as high powder dyed with Congo red (congocoll), are useful substrates for assaying proteinases. Hydrolysis of the protein releases soluble colored products which can be measured readily. Soluble colored products also can be produced by solutions containing proteins having a strong affinity for the non-covalently bound dye of the substrate. In such cases, false indications of proteolytic activity are obtained through the non-enzymic formation of soluble protein-dye complexes. The non-enzymic process can be detected by changes in the absorption spectrum and by differences in the kinetics of color formation in the presence of excess liquid phase. Enzymic degradation of the insoluble substrates is proportional to both the concentration of the enzyme and the interfacial area of the substrate. Non-enzymic color production is determined by the total amount of soluble protein and does not increase with time. Non-enzymic contributions can be minimized by use of sufficient substrate or with blanks containing suitably inactivated enzyme. (Author)

AD-627 367 Fld. 6/1
CFSTI Prices: HC $1.00 MF $0.50
ARMY MEDICAL RESEARCH LAB FORT KNOX KY
INTERACTIONS BETWEEN CORTISOL OR CORTICOSTERONE AND FRACTIONS OF RAT THYMUS, BRAIN AND HEART CELL,
by Frank DeVenuto, and Gerald Chader. 17 Sep 65, 19p. Rept. no. USAMRL-639
Proj. DA-3A014501B71P

Unclassified report

Descriptors: (*Corticosteroid agents, Tissues (Biology)), (*Cytochemistry, Corticosteroid agents), Thymus, Brain, Heart, Cells (Biology), Steroids, Hormones, Cytoplasm, Proteins, Rats

Interactions between (4-14C) cortisol or (4-14C) corticosterone and fractions of thymus, brain and heart cells of normal rats have been studied by multiple equilibrium dialysis; animals of different age, ranging from weaned (20 days of age) to adult (45 days) to old rats (100 days and over) have been used. Binding between the steroid hormones and total homogenates of thymus, brain and heart of the rat has also been investigated. The combining affinity for the two steroids with cytoplasmic fractions is greater than with nuclear fractions, especially for thymus and heart cell. The binding of corticosterone with all the fractions and the total homogenates obtained from animals of different age is higher than that observed with cortisol. A characteristic pattern showing a low binding affinity for 45 days old rats is observed in the interaction between the steroid hormones and some fractions for animals of different age. No accumulation of radioactive material was found in any particular fraction of the tissues investigated. (Author)

AD-627 486 Fld. 6/1
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL) DEPT OF BIOPHYSICS
PREPARATION AND PROPERTIES OF WATER-INSOLUBLE DERIVATIVES OF UREASE,
by Erella Riesel, and Ephraim Katchalski. 1 Nov 63, 4p. Contract AF-EOAR-59-63 ,PHS-AM-03083
AFOSR 65-2173

Unclassified report

Availability: Published in The Journal of Biological Chemistry, v239 n5 p1521-4 May 1964. Copies to DDC users only.

Descriptors: (*Urease, Biochemistry), Synthesis (Chemistry), Chemical properties, Solubility, Amino acids, Phenylalanine, Catalysis, Proteins, Enzyme inhibitors, Benzoates, Urine, Blood serium, Biological assay, Israel

Water-insoluble urease preparations were obtained by coupling unmodified urease, or urease reversibly inactivated with p-chloromercuribenzoate, with a water-insoluble diazonium salt derived from a copolymer of p-amino-DL-phenylalanine and L-leucine (molar residue ratio, 1:2.5). The enzymatic activity of the insoluble preparations derived from inactivated urease was determined after reactivation with cysteine. All of the insoluble derivatives obtained, which contained 15 to 60 mg of protein per 100 mg of water-insoluble enzyme, displayed after preparation an enzymatic activity, per unit of weight of bound protein, corresponding to about half of that of the original urease preparation used in the coupling reaction. The water-insoluble urease derivative 1U7, derived from urease inactivated by the minimal amount of p-chloromercuribenzoate, retained most of its activity even after 5 months of storage at 4C under 0.1 M Tris-sulfate buffer, pH 7.5. The water-insoluble urease preparations 1U1, 1U2, 1U3, and 1U4, derived from unmodified urease, on the other hand, lost most of their activity within 2 weeks when stored under similar conditions. (Author)

AD-627 509 Fld. 6/1, 20/3
CFSTI Prices: HC $1.00 MF $0.50
POMONA COLL CLAREMONT CALIF
ELECTRON SPIN RESONANCE STUDIES OF PHOTOSYNTHETIC SYSTEMS.
Final rept., 1 Jan 63-31 Dec 65,
by Power B. Sogo. 18 Jan 66, 4p. Contract Nonr-4028 (00) Proj. NR-304-473

Unclassified report

See also AD-618 241.

Descriptors: (*Chloroplasts, Electron spin resonance), (*Photosynthesis, Electron spin resonance), (*Electron spin resonance, Chloroplasts), Chlorophylls, Plants (Botany)

The behavior is described of photo-induced ESR signals in spinach chloroplasts at low temperature. Three ESR signals are observed in the temperature range -35C to -124C. One appears to be uncoupled from the light absorption process while the other two are photo-induced. The concentrations of the radicals responsible for the latter two signals have been studied as a function of integrated illumination time and temperature. (Author)

AD-627 511 Fld. 6/1, 6/15
WALTER REED ARMY INST OF RESEARCH WASHINGTON D C DEPT OF MOLECULAR BIOLOGY
DNA: REACTION WITH CHLOROQUINE,
by James L. Allison, Richard L. O'Brien, and Fred E. Hahn. 15 Jun 65, 2p.

Unclassified report

Availability: Published in Science, v149 n3688 p1111-3 3 Sep 1965. Copies to DDC users only.

Descriptors: (*Desoxyribonucleic acids, Chemical reactions), (*Chinchona alkaloids, Chemical reactions), Antimalarials, Absorption spectrum, Complex compounds, Molecular association, Dissociation, Stabilization

Difference spectrophotometry shows that double-stranded DNA produces marked changes in the absorption spectrum of chloroquine; only minor changes occur with single-stranded DNA. A DNA-chloroquine complex was demonstrated to sediment in the analytical ultracentrifuge. Chloroquine strongly elevated the thermal dissociation temperature of DNA. It is concluded that the drug forms a complex with DNA by ionic interaction and stabilizes the helix. (Author)

AD-627 625 Fld. 6/1, 6/13
LEICESTER UNIV (ENGLAND) DEPT OF BIOCHEMISTRY
THE UTILIZATION OF ACONATE AND ITACONATE BY MICROCOCCUS SP,
by R. A. Cooper, K. Itiaba, and H. L. Kornberg. 4 May 64, 7p. Contract AF-EOAR-17-63 Proj. AF-9777 Task 977701
AFOSR 65-2516

Unclassified report

Availability: Published in Biochem. J. v94 p25-31 1965. Copies to DDC users only.

Descriptors: (*Micrococcus, Culture media), (*Succinates, Metabolism), Carboxylic acids, Enzymes, Great Britain, Coenzymes, Succinic acids, Lactones, Aldehydes, Catalysis, Bacterial extracts

An organism, identified as Micrococcus sp., was isolated by elective culture on aconate; it also grew on itaconate. Washed suspensions of the aconate-grown organism readily oxidized intermediates of the tricarboxylic acid cycle, aconate and succinic semialdehyde, but not itaconate. Itaconate-grown cells oxidized tricarboxylic acid-cycle intermediates, succinic semialdehyde and itaconate, but not aconate. Succinate -grown cells oxidized neither itaconate nor aconate. Extracts of aconate-grown cells catalysed the formation of succinic semialdehyde and carbon dioxide, in equimolar amounts, from aconate. In the presence of NAD or NADP, succinic semialdehyde was oxidized to succinate with concomitant reduction of the coenzyme. Extracts of itaconate-grown cells catalysed the formation of pyruvate and acetyl-CoA from itaconyl-CoA. Key enzymes involved in the formation of succinate from aconate, and of pyruvate and acetyl-CoA from itaconate, were distinct and inducible: their formation preceded growth on the appropriate substrate. (Author)

AD-627 706 Fld. 6/1, 6/5
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
BIOCHEMICAL ASPECTS OF THE INHIBITION OF LIVER REGENERATION BY TRANSFUSION OF HEPATECTOMIZED RATS WITH BLOOD FROM NORMAL RATS.
by R. Goutier, George F. Leong, I. Ilardi-Bologna, L. Baugnet-Mahieu, and R. Vandergoten. 29 Nov 65, 23p. Rept. no. USNRDL-TR-947 Task MR005.08-5201

Unclassified report

Descriptors: (*Liver, Regeneration), (*Blood transfusions, Regeneration), (*Desoxyribonucleic acids, Synthesis), Inhibition, Enzymes, Ribonucleic acids, Growth, Mitosis, In vitro analysis, Tritiated compounds, Phosphorus transferases, Microsomes, Rats

Recent studies in this Laboratory concerning the effect of massive transfusions on parenchymal cell division in partially hepatectomized rats with blood from normal rats have shown the presence of a humoral factor whichplays a role in the control of DNA synthesis in regenerating liver. The effect of such transfusions has been tested on the levels of different enzymes involved in the synthesis of liver nucleic acids. The activities of nuclear RNA polymerase, and TdR- and TMP-kinases are not significantly altered by the transfusion, whereas DNA polymerase is significantly decreased. Moreover, the microsomes, which play a role in the regulation of DNA polymerase action by inhibiting the enzyme activity, have an inhibitory capacity approaching near normal levels. Thus, the decreased DNA synthesis for regenerating liver in transfused animals may possibly be explained in the basis of decreased DNA polymerase activity mediated by the microsomes of the liver. (Author)

AD-627 851 Fld. 6/1
OXFORD UNIV (ENGLAND) DEPT OF PHARMACOLOGY
HISTORICAL INTRODUCTION: SPECIFIC INTERACTIONS BETWEEN CATECHOLAMINES AND TISSUES,
by H. Blaschko. 1964, 11p. Contract AF-EOAR-62-80
AFOSR 65-2961

Unclassified report

Availability: Published in Progress in Brain Research, v8 p1-8 1964. Copies to DDC users only.

Descriptors: (*Nervous system, Amines), (*Amines, Biosynthesis), (*Tissues (Biology), Amines), Sensitivity, Stereochemistry, Carboxy-lyases, Amino acids

A brief review is given of the development of our ideas on specificity. One of the specific sites of importance in the formation of the catechol amines is the enzyme L-dopa decarboxylase. The significance of the phenolic hydroxyl groups, of the alpha-hydrogen atom and of the amino group is discussed. These ideas concern the importance of the meta-hydroxy group and also the fact that the alpha-methyl-amino acids are decarboxylated. It is shown that the new ideas on the structure of pyridoxal enzymes are compatible with earlier pictures of the enzyme-substrate interaction. (Author)

AD-627 871 Fld. 6/1, 7/3
DEFENCE CHEMICAL BIOLOGICAL AND RADIATION LABS OTTAWA (ONTARIO)
THE INTERACTION OF THE ACETATES AND CARBAMATES OF SOME HETEROCYCLIC ALCOHOLS WITH ACETYLCHOLINESTERASE,
by K. B. Shaw. 24 Jun 65, 7p. Rept. no. DCBRL-455B

Unclassified report

Availability: Published in Canadian Journal of Chemistry v43 p3264-8 1965. Copies to DDC users only.

Descriptors: (*Acetylcholinesterase, Chemical reactions), (*Cholinesterase inhibitors, Synthesis (Chemistry)), (*N-heterocyclic compounds, Acetylcholinesterase), Acetates, Carbamic acids, Esters, Alcohols, Reaction kinetics, Canada

The N, N-dimethylcarbamates of 3-quinuclidinol, 1-methyl-3-piperidinol, and 1-methyl-4-piperidinol were prepared and found to be weak inhibitors of acetylcholinesterase. The acetates of the above alcohols were also prepared and found to be moderately good substrates for this enzyme. (Author)

AD-627 942 Fld. 6/1
BRUSSELS UNIV (BELGIUM)
ALTERATION DU COMPORTEMENT DES RIBOSOMES A LA SUITE D'UNE MUTATION SUPERPRESSEUR. III. ETUDE ELECTROPHORETIQUE DES PROTEINES RIBOSOMIALES (MODIFICATION OF RIBOSOME BEHAVIOR BY A SUPPRESSOR MUTATION. III. ELECTROPHORETIC STUDY OF RIBOSOMAL PROTEINS,
by A. Bollen, A. Herzog, and R. Thomas. 1965, 4p. Contract AF-EOAR-20-65 Proj. AF-9777 Task 977701
AFOSR 65-2040

Unclassified report

Availability: Published in Archives Internationales de Physiologie et de Biochimie, v73, n3 p557-8 1965. Copies to DDC users only.

Descriptors: (*Ribosomes, Electrophoresis), Proteins, Escherichia coli, Mutations, Belgium

The proteins from the 30 S ribosome fractions of two different strains of E. coli K 12, which differ only by a suppressor mutation, yield different electrophoretic patterns. Electrophoresis of the 50 S particles gives identical patterns, but the 30 S fraction of one of the strains (112-12+pm) has a rapidly migrating protein fraction that is either missing or substituted by a slow band in the other strain (112-12-pm). (Author)

AD-627 950 Fld. 6/1
FLORIDA STATE UNIV TALLAHASSEE INST OF MOLECULAR BIOPHYSICS
PHOTOSYNTHESIS.
Scientific review, 1963-1965,
by Hans Gaffron. 1965, 41p. Rept. no. BSCS-Pamplets-24
Contract Nonr-988 (10) ,AF-AFOSR-662-64
Proj. AF-9777 Task 977701
AFOSR 65-2976

Unclassified report

Availability: D. C. Heath and Co., 285 Columbus Ave., Boston, 16, Mass.

Descriptors: (*Photosynthesis, Reviews), Chlorophylls, Photochemistry, Phosphorylation, Carbon dioxide, Reduction (Chemistry)

Contents: Observing the photosynthesizing plant, Visible radiation and pigments, Primary and secondary reactions, The chlorophyll complex, The decomposition of water (Photolysis), Photophosphorylation, The reduction of carbon dioxide, Summary of photosynthesis, Evolutionary aspects of photosynthesis.

AD-628 032 Fld. 6/1, 6/3
CFSTI Prices: HC $2.00 MF $0.50
UNIVERSITY COLL GALWAY (EIRE) DEPT OF BIOCHEMISTRY
ALGAL BILIPROTEINS AND THEIR PHYCOBILIN PROSTHETIC GROUPS.
Final rept.,
by C. O. hEocha. 29 Sep 65, 32p. Contract AF-EOAR-18-63
AFOSR 65-2651

Unclassified report

Descriptors: (*Bile pigments, Preparation), (*Algae, Bile pigments), Eire, Distribution, Biochemistry, Chemical analysis

Two crystalline urobilins were prepared from phycoerythrobilin and their spectral and optical properties determined. A derivative of phycoerythrobilin was obtained by methanolic extraction of Red Algae. A thermolabile aqueous of a Red Alga formed a bilin from a haemtype substrate. (Author)

AD-627 276 See Fld. 7/3

AD-627 286 See Fld. 6/13

AD-627 368 See Fld. 6/20

AD-627 485 See Fld. 6/3

AD-627 772 See Fld. 6/16

AD-627 810 See Fld. 6/16

AD-627 862 See Fld. 6/18

6/3. BIOLOGY

AD-627 273 Fld. 6/3
WALTER REED ARMY INST OF RESEARCH WASHINGTON D C
AUERBACH'S PLEXUS OF THE RAT CECUM IN RELATION TO THE GERMFREE STATE,
by Jean-Rene Dupont, Helen Roland Jervis, and Helmuth Sprinz. 1965, 8p.
Unclassified report

Availability: Published in The Journal of Comparative Neurology v125 n1 p11-8 Aug 1965. Copies to DDC users only.

Descriptors: (*Germ-free animals, Intestines), (*Intestines, Germ-free animals), Autonomic nervous system, Adaptation (Physiology), Nerve cells, Ganglia, Muscles, Growth, Enzymes, Nucleotides, Acetylcholinesterase, Histology, Rats

The cecum of germfree rats, after the second week of life, enlarges sixfold over that of conventional tankraised controls. Poor muscle tone as well as dietary factors have been incriminated. The myenteric plexus of the cecum in conventional and germfree rats was studied in an effort to find a neuronal explanation of the phenomenon and to test whether the neurovegetative periphery is capable of adapting to the changing size. With routine and histochemical technics three salient features stood out: (1) The myenteric neurones in the cecum of the germfree rat on an average were three times larger than those of the controls (42 microns vs 16 microns). Some neurones of the germfree cecum attained giant size (over 150 microns). (2) They showed a lower DPNH diaphorase activity, unrelated to the increased cell size. (3) In the germfree rat cecum the meshes of the primary fiber plexus of Auerbach had increased in size along the antimesenteric border, while the network under the mesenteric attachment was smaller. The ratio between the network of the two sides was 1:12 in the germfree, 1:5 in the controls. It was concluded that the neurones of Auerbach's plexus in the germfree cecum are indeed less active metabolically--a factor which may perpetuate the cycle of cecal distention in these animals. The neurovegetative periphery in the cecum has shown itself capable to responding to the increased cecal volume by neuronal hypertrophy. (Author)

AD-627 277 Fld. 6/3
WALTER REED ARMY INST OF RESEARCH WASHINGTON D C DEPT OF ENTOMOLOGY
NOTES ON SOME LABORATORY-REARED CULISETA MELANURA (COQUILLETT),
by L. C. Rutledge, and R. A. Ward. 1964, 2p.
Unclassified report

Availability: Published in Mosquito News v25 n2 p219-20 Jun 1965. Copies to DDC users only.

Descriptors: (*Culicidae, Life cycle), Larvae, Adults, Growth, Food

AD-627 296 Fld. 6/3
SEATO MEDICAL RESEARCH LAB BANGKOK (THAILAND)
THE DISTRIBUTION OF AEDES AEGYPTI IN THAILAND,
by John E. Scanlon. 1964, 5p.
Unclassified report

Availability: Published in Mosquito News, v25 n2 p199-203 Jun 1965. Copies to DDC users only.

Descriptors: (*Aedes, Thailand), Distribution, Epidemiology, Dengue, Fevers, Disease vectors, Diseases, Urban areas

Aedes aegypti, a mosquito believed to be African in origin, has become widespread and abundant in Thailand. It has been distributed largely through human activity, and it is strongly tied to man as a source of blood meals. In Thailand, it is primarily an urban species, but large populations may be found in smaller towns and villages, particularly along the main lines of commerce and travel. Aedes aegypti larvae are sometimes found in treeholes near human habitations in Thailand, but there is no indication that it has become completely sylvan, as some forms are known to be in Africa. In forested areas of Thailand Aedes aegypti is replaced by other members of the subgenus Stegomyia, notably Aedes albopictus. Both of these species are believed to be vectors of dengue fever virus, but only Aedes aegypti has been associated thus far with the hemorrhagic form of the disease which as appeared in children in some parts of Thailand. The distribution of aegypti appears to be much wider than the hemorrhagic form of the disease in Thailand. No satisfactory explanation for this pattern of distribution is available as yet. Effective control or eradication of Aedes aegypti should reduce or eliminate epidemics of classical dengue fever and hemorrhagic fever in urban areas, but the presence of natural populations of Aedes albopictus may make eradication of the diseases impossible. (Author)

AD-627 336 Fld. 6/3
CFSTI Prices: HC $1.00 MF $0.50
MARYLAND UNIV COLLEGE PARK DEPT OF ZOOLOGY
CURRENT REFERENCES IN MEDICAL ENTOMOLOGY FROM RUSSIAN, CENTRAL AND EASTERN EUROPEAN AND CHINESE LITERATURE, VOL. 5, NO. 1,
by Alena Elbl. 1966, 16p. Contract DA-49-193-MD-2238
TT 66-60431
Unclassified report

See also AD-625 274.

Descriptors: (*Insects, Disease vectors), (*Disease vectors, Indexes), Ticks, Mites, Diptera, Siphonaptera, Protozoa, Rickettsia, Parasitic diseases, Virus diseases, Insect control, USSR, Eastern Europe, China

AD-627 404 Fld. 6/3
CFSTI Prices: HC $1.00 MF $0.50
FLORENCE UNIV (ITALY) INST OF ZOOLOGY
ASTRONOMICAL ORIENTATION OF CRUSTACEA.
Scientific rept.,
by L. Pardi. 30 Jun 65, 8p. Contract AF-EOAR-55-64 Proj. AF-9777 Task 977701
AFOSR 65-2010
Unclassified report

Continuation of grant AF-EOAR-62-100.

Descriptors: (*Crustacea, Behavior), Celestial mechanics, Ecology, Motion, Italy, Sun

The work was undertaken to ascertain on what basis do the animals 'know' that after the equinox of September the sun begins to culminate in the South, that is, at midday its azimuth is exactly that of the Theoretical Line of Escape (TLE). Results demonstrated that a population with TLE south, in clockwise phase, compensates perfectly for the apparent clockwise motion, while in a population with TLE north, the compensation is imperfect and distrubed. It seems probable that in the populations precisely subequatorial, the affirmed and valid compensation mechanism differs according to the TLE. (Author)

AD-627 485 Fld. 6/3, 6/1
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL) DEPT OF BIOPHYSICS
USE OF POLY-ALPHA-AMINO ACIDS IN BIOLOGICAL STUDIES,
by Ephraim Katchlski. 1964, 18p. Contract AF-EOAR-59-63
AFOSR 65-2170
Unclassified report

Availability: Published in New Perspectives in Biology, v4 p51-68 1964. Copies to DDC users only.

Descriptors: (*Amino acids, Polymers), (*Peptides, Synthesis (Chemistry)), Glutamic acid, Trypsin, Chymotrypsin, Peptide hydrolases, Tyrosine, Papain, Hydrolysis, Antigens + antibodies, Ribonucleic acids, Viruses, Israel

A description is given of the use of polyamino acids in biological studies, with emphasis on work carried out at the Wiezmann Institute. Topics include: Synthesis of poly-alpha-amino acids (poly-L-proline, poly-alpha, L-glutamic acid, poly-L-lysine); polyamino acids as substraits for proteolytic enzymes (tryptic digestion of poly-L-lysine, chymotryptic digestion of tyrosine-containing copolymers, hydrolysis of poly-L-glutamic acid by papain, proline iminopeptidase, polyamino acids in the search for new proteolytic enzymes); polypeptidyl proteins; water-insoluble enzyme derivatives; antigencity of polyamino acids and polypeptidyl proteins; transfer-RNA polypeptides; interaction of polyamino acids with viruses.

AD-627 515 Fld. 6/3, 18/6, 22/2
MITRE CORP BEDFORD MASS
RADIATION SHIELDING REQUIREMENTS FOR MANNED SATELLITES.
Revised ed.,
by Francis W. French, and Kent F. Hansen. 12 Mar 65, 8p. Contract AF19 (628)-2390 Proj. 611.1
ESD TDR-64-151
Unclassified report

Revision of manuscript submitted 19 Aug 64.

Availability: Published in Journal of Spacecraft and Rockets, v2 n6 p931-7 Nov-Dec 1965. Copies to DDC users only.

Descriptors: (*Shielding, Manned spacecraft), (*Space environmental conditions, Manned spacecraft), Operations research, Radiation tolerance, Terrestrial magnetism, Solar flares, Van Allen radiation belt, Cosmic rays, Space biology

The radiation shielding requirements for the protection of the crews of manned satellites are investigated. Two diverse types of missions are studied: a long-duration, high-altitude mission above the Van Allen Belt, and a short-duration, low-altitude, polar mission below it. Radiobiological tolerance criteria are considered, and a criterion based on partial recovery of sustained somatic damage is examined for the long-duration mission. Model solar flare, cosmic, and Van Allen Belt radiation environments are postulated. Radiation transport calculations are carried out to obtain the biological doses due to the various environmental components. Curves of dose vs shielding thickness, together with the model environments and the postulated radiobiological tolerance criteria, are used to calculate minimum amounts of shielding. For the high-altitude mission, results show that considerable savings in shielding weight are obtained if a radiation recovery criterion, rather than a straight cumulative-dose criterion, is used. For the low-altitude mission, the effects of different geomagnetic field models in modifying the free-space dose and the results of using different target models are illustrated. (Author)

AD-627 552 Fld. 6/3
UNIVERSITY COLL LONDON (ENGLAND) DEPT OF ANATOMY
FORCES EXERTED BY OCTOPUS VULGARIS,
by Noel Dilly, Marion Nixon, and Andrew Packard. 2 Jan 64, 12p. Contract AF-EOAR-2-63
Proj. AF-9777 Task 977701
AFOSR 65-2840
Unclassified report

Availability: Published in The Pubbl. Stazione

Zoologica, Napoli, v34 p86-97 1964. Copies to DDC users only.

Descriptors: (*Cephalopoda, Strength), Force (Mechanics), Swimming, Muscles, Arms, Body weight, Marine biology, Behavior, Training, Great Britain

Measurements were made of the maximum pulling forces of octopuses and compared with their body weights. An increase in the maximal pulling force was found to be 2.0 kg/0.10 kg body weight up to 0.50 kg above which the force increased less rapidly with body weight. Two observations were made on the ability of octopuses to push (lift) heavy objects. The forces were found to be approximately half of those in the pulling experiments. Maintained pulls were observed and found to be never more than 50% of the value obtained in maximal pulls by the same animal. Pulls made during swimming were measured in some octopusese and were found to be similar in all of the animals although of wide differences in weight. The arms: body weight ratios were measured and given as a percentage of the total body weight. (Author)

AD-627 576 Fld. 6/3, 6/16, 6/15
MICHIGAN UNIV ANN ARBOR DEPT OF PHYSIOLOGY
RENAL TRANSPORT OF GLUCOSE BY THE AGLOMERULAR FISH LOPHIUS AMERICANUS,
by Richard L. Malvin, Edward J. Cafrun, and Howard Kutchai. 26 Oct 64, 4p. Contract Nonr-1224 (26) ,PHS-A-3885

Unclassified report

Prepared in cooperation with Mount Desert Island Biological Lab., Salisbury Cove, Me.

Availability: Published in Journal of Cellular and Comparative Physiology v65 n3 p381-4 Jun 1965. Copies to DDC users only.

Descriptors: (*Fishes, Kidneys), (*Kidneys, Glucose), (*Glucose, Excretion), Transport properties, Permeability, Urine, Absorption (Biological)

The renal excretion of glucose by the aglomerular fish Lophius americanus was studied. It was found that glucose is a normal constituent of Lophius urine. U/P ratios were approximately 0.02. However, after elevation of plasma glucose level or injection of phlorizin the U/P ratio for glucose was increased as much as ten fold. This increase in U/P ratio was observed even if urine was collected directly from the ureter rather than from the bladder. These results are consistent with the hypothesis that glucose is able to diffuse across the renal tubular epithelium, which also has the ability to reabsorb glucose which diffuses into the urine. (Author)

AD-627 594 Fld. 6/3, 5/10
ARMY MEDICAL RESEARCH LAB FORT KNOX KY EXPERIMENTAL PSYCHOLOGY DIV
AUDITORY SENSITIVITY OF THE RHESUS MONKEY,
by Issac Behar, James N. Cronholm, and Michel Loeb. 12 Nov 65, 11p. Rept. no. USAMRL-647 Proj. DA-3A014501A74D Task 3A014501A74D00

Unclassified report

Availability: Published in Journal of Comparative Physiological Psychology v59 n3 p426-8 1965. Copies to DDC users only.

Descriptors: (*Auditory perception, Thresholds (Physiology)), (*Monkeys, Auditory perception), Hearing, Sensitivity, Audiofrequency, High frequency, Audiometry, Psychophysiology, Humans

Free-field behavioral auditory thresholds were obtained from four simian Ss at 16 frequencies and from seven humans Ss at 14 frequencies under comparable conditions. Human thresholds were generally slightly lower through 4 kc, while above that the simian thresholds were lower. The rhesus monkey retains good sensitivity until at least 31.5 kc. (Author)

AD-627 624 Fld. 6/3
LONDON UNIV (ENGLAND) INST OF LARYNGOLOGY AND OTOLOGY
THE AUDITORY APPARATUS OF THE HETEROMYIDAE (RODENTIA, SCIUROMORPHA),
by Ade Pye. 1965, 14p. Contract AF-EOAR-30-63 Proj. AF-9777 Task 977701 AFOSR 65-2519

Unclassified report

Availability: Published in J. Anat., Long. v99 n1 p161-47 1965. Copies to DDC users only.

Descriptors: (*Rodents, Ear), Acclimatization, Adaptation (Physiology), Deserts, Morphology (Biology), Histological techniques, Great Britain

The structure of the ears of the family Heteromyidae is discussed in relation to the phylogeny and classification of the family. A successful histological technique for the intra-vitam fixation and processing of the ears is described. The results indicate that, in the more advanced members of the family, the middle ear and especially the cochlea of the inner ear have become extremely modified. The supposed phylogenetic line can thus be followed in the structure of the ears alone. The possible functions of these special modifications cannot be assessed until more is known of the general cochlear physiology. (Author)

AD-627 827 Fld. 6/3, 5/10
COMMUNICATION RESEARCH INST MIAMI FLA
SONIC-ULTRASONIC EMISSIONS OF THE BOTTLENOSE DOLPHIN,
by John C. Lilly. 1963, 8p. Contract AF-AFOSR-415-63 Proj. AF-9777 Task 977701 AFOSR 65-2944

Unclassified report

Availability: Published in Proceedings of International Symposium on Cetacean Research (1st), Washington, D. C., 1963. Copies to DDC users only.

Descriptors: (*Cetacea, Marine biological noise), (*Marine biological noise, Cetacea), Symposia, Ultrasonic radiation, Sound, Verbal behavior

AD-627 986 Fld. 6/3
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
ISOLATION OF STREPTOCOCCUS EQUI FROM BURROS,
by W. G. Wisecup, C. M. Schroder, and N. P. Page. 28 Dec 65, 18p. Rept. no. USNRDL-TR-960 NAVMED MR005.08-5201-1

Unclassified report

Descriptors: (*Equines, Infections), (*Streptococcus, Equines), Diagnosis, Abscesses, Lymphatic system Diseases, X rays, Pathology

An insidious disease was found in an experimental herd of burros in which the primary manifestations were debilitation and the presence of abscesses in abdominal lymph nodes. Streptococcus equi was isolated from these abscesses and also from the nares of many affected animals. (Author)

AD-627 288 See Fld. 6/15

AD-627 292 See Fld. 6/18

AD-627 634 See Fld. 6/16

AD-627 754 See Fld. 5/10

AD-627 766 See Fld. 13

AD-628 032 See Fld. 6/1

6/4. BIONICS

AD-627 908 See Fld. 9/2

6/5. CLINICAL MEDICINE

AD-627 268 Fld. 6/5
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C DEPT OF OPHTHALMIC PATHOLOGY
CONTUSIVE ANGLE RECESSION IN PHACOLYTIC GLAUCOMA,
by Morton E. Smith, and Lorenz E. Zimmerman. 25 May 65, 6p. Contract PHS-3-T1-NB-5379-03S1

Unclassified report

Availability: Published in Archives of Ophthalmology v74 p799-804 Dec 1965. Copies to DDC users only.

Descriptors: (*Eye, Pathology), Ophthalmology, Retina, Optic nerve, Diseases, Diagnosis, Etiology, Histology, Surgery

Heretofore, phacolytic glaucoma has been thought to occur almost exclusively as a complication of senile hypermature cataracts unassociated with other intraocular disease. The present study shows that in nearly 25% of the cases there is definite evidence of angle recession characteristic of old contusion. Trauma may play a significant pathogenetic role in phacolytic glaucoma in several ways. While prompt cataract extraction may be curative in many cases of phacolytic glaucoma, unsatisfactory results may be obtained if there has been considerable subclinical damage to the retina and optic nerve prior to the onset of phacolytic glaucoma. (Author)

AD-627 270 Fld. 6/5
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
SOLITARY LICHEN PLANUS,
by Lee R. Lumpkin, and E. B. Helwig. 2 Jun 65, 2p.

Unclassified report

Availability: Published in Archives of Dermatology v93 p54-5 Jan 1966. Copies to DDC users only.

Descriptors: (*Lichens, Pathology), Skin, Morphology (Biology), Biopsy, Histology, Diagnosis

Biopsy specimens from ten patients with solitary cutaneous lesions revealed the histopathologic changes of lichen planus. None of the lesions were clinically diagnosed as lichen planus. They may represent solitary lesions of lichen planus or a separate entity that cannot be distinguished on histologic grounds. (Author)

AD-627 272 Fld. 6/5
WALTER REED ARMY INST OF RESEARCH WASHINGTON D C DEPT OF HEMATOLOGY
INTRAVASCULAR HEMOLYSIS DUE TO INTRACARDIAC PROSTHETIC DEVICES,
by David A. Sears, and William H. Crosby. 30 Nov 64, 14p.

Unclassified report

Availability: Published in American Journal of Medicine v39 n2 p341-54 Aug 1965. Copies to DDC users only.

Descriptors: (*Heart, Surgery), (*Prosthetics, Heart), (*Implants, Hemolysis), Cardiovascular system, Tolerances (Physiology), Hemo-

globulin, Excretion, Erythrocytes, Anemias, Etiology, Diagnosis, Urine, Blood plasma

Studies are described on two adult patients in whom intravascular hemolysis developed following open heart surgery in which intracardiac prosthetic materials were implanted. In one patient an ostium primum interatrial septal defect was closed using a Teflon patch. In the other a Starr-Edwards caged ball-valve prosthesis was used to replace the aortic valve. In the first patient there was a striking pattern of diurnal hemoglobinuria, and subsequent investigations revealed a consistent relationship between activity (and, therefore, presumably cardiac output) and the rate of hemolysis as judged by urinary hemoglobulin output and plasma heme pigment levels. These findings support the concept that hemolysis in such patients occurs as a result of intracardiac mechanical damage to red cells. The plasma heme pigments were identified as free hemoglobin and methemalbumin which were present in fairly consistent proportions, the latter accounting for the majority of the plasma pigment. Iron studies demonstrated a significant urinary iron loss even with minimal hemoglobinuria. It was suggested that plasma transaminase increases in these patients might be a result of intravascular release of the enzyme from hemolyzed red cells. The implications of the findings for diagnosis, treatment and prognosis of this syndrome of mechanical intravascular hemolysis are explained. (Author)

AD-627 280 Fld. 6/5
WALTER REED ARMY INST OF RESEARCH WASHINGTON D C DIV OF CLINICAL SURGERY
FATE OF DEARTERIALIZED SPLEEN,
by Martin L. Dalton,Jr., and R. Lee West. 26 Apr 65, 4p.

Unclassified report

Availability: Published in Archives of Surgery v91 p541-4 Sep 1965. Copies to DDC users only.

Descriptors: (*Spleen, Surgery), Arteries, Excision, Blood circulation, Morphology (Biology), Pathology, Histology

The increasingly common use of the splenic artery in the restoration of blood flow to other organs has brought up the issue of the outcome of the dearterialized spleen. The results of this experimental study indicate that the effects, grossly and microscopically, of splenic dearterialization are negligible. (Author)

AD-627 283 Fld. 6/5
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
HUMAN RABIES ENCEPHALITIS. A STUDY OF FORTY-NINE FATAL CASES WITH A REVIEW OF THE LITERATURE,
by Jean R. Dupont, and Kenneth M. Earle. 1964, 12p.

Unclassified report

Availability: Published in Neurology v15 n11 p1023-34 Nov 1965. Copies to DDC users only.

Descriptors: (*Rabies virus, Diseases), Etiology, Disease vectors, Pathology, Mortality rates, Mammals, Bites + stings, Diagnosis, Brain, Central nervous system, Nerve cells, Spinal cord, Therapy, Immune serums, Histology, Reviews

We have reviewed the files of the Armed Forces Institute of Pathology from 1930 through 1964 and found 49 cases of reasonably well-established, fatal human rabies encephalitis, with records and histopathologic material adequate for study. Most fatal human cases occurred in young adult males, and nearly one-fourth were in children. There was a definite male prevalence even among the youngsters. Dog bites accounted for 51% of fatal cases in this material; however, a surprisingly large number yielded no history of animal exposure whatsoever. Upper extremities, face, and lower extremities were bitten in decreasing order of frequency but had no bearing on the subsequent duration of the incubation period, which averaged 57.3 days. The mean clinical course ran 7.4 days. Neuritis, chills, and fever were the commonest prodromal symptoms, whereas psychiatric or pharyngeal manifestations became dominant in the fully developed clinical picture.

AD-627 284 Fld. 6/5
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
NEONATAL JAUNDICE. A CRITICAL REVIEW OF PERSISTENT OBSTRUCTIVE JAUNDICE IN INFANCY,
by Hans F. Smetana, Jules B. Edlow, and Paul R. Glunz. 2 Aug 65, 22p.

Unclassified report

Availability: Published in The Archives of Pathology, v80 p533-74 Dec 1965. Copies to DDC users only.

Descriptors: (*Biliary system, Infants), (*Infants, Hepatitis (Nonviral)), (*Obstruction (Physiology), Biliary system), Liver, Pathology, Biopsy, Histology, Surgery, Gallbladder, Bile pigments, Excretion, Infectious hepatitis, Embryology, Etiology

Cases of neonatal jaundice can be divided into two groups: nonobstructive and obstructive. Instances of nonobstructive neonatal jaundice are related to hemolytic phenomena, inflammatory causes, or inborn failure of the bilirubin metabolism. Obstructive neonatal jaundice can be caused by: (1) extrahepatic biliary atresia, complete or segmental, (2) intrahepatic biliary atresia of all interlobular bile ducts or of ducts of either the first or second order, (3) combinations between extrahepatic and intrahepatic biliary atresia, (4) complete giant cell transformation of the hepatic parenchyma, (5) partial giant cell transformation of the hepatic parenchyma, (6) combinations of giant cell transformation and any of the forms of biliary atresia, extrahepatic or intrahepatic. Correction of any of the types of extrahepatic biliary atresia is possible only if normal bile ducts, containing regular bile, are available for anastomosis. As yet it has not been possible to correct intrahepatic biliary atresia by surgical means. (Author)

AD-627 287 Fld. 6/5
WALTER REED ARMY INST OF RESEARCH WASHINGTON D C DEPT OF HEMATOLOGY
THE ABSORPTION OF NONFERROUS METALS IN IRON DEFICIENCY,
by Simeon Pollack, James N. George, Richard C. Reba, Richard M. Kaufman, and William H. Crosby. 14 Dec 64, 4p.

Unclassified report

Availability: Published in Journal of Clinical Investigation, v44 n9 p1470-3 1965. Copies to DDC users only.

Descriptors: (*Iron, Deficiency diseases), (*Absorption (Biological), Metals), Diet, Transport properties, Metabolism, Hemorrhage, Cobalt, Manganese, Cesium, Magnesium, Mercury, Calcium, Copper, Zinc, Rats

The intestinal absorption of cobalt and manganese was increased in rats rendered iron deficient by bleeding and diet. The intestinal absorption of cesium, magnesium, mercury, calcium, and copper was not increased in rats consuming an iron-deficient diet but was unchanged in bled rats. (Author)

AD-627 289 Fld. 6/5, 6/13
WALTER REED ARMY INST OF RESEARCH WASHINGTON D C DIV OF MEDICINE
VIRAL HEPATITIS IN KOREA: CLINICAL OBSERVATIONS AND STUDIES PERFORMED DURING PROSPECTIVE STUDIES TO OBTAIN SPECIMENS FOR VIROLOGIC CULTURE,
by Marcel E. Conrad, Lewis R. Weintraub, Franklin D. Schwartz, and Allen A. Young. 1964, 21p.

Unclassified report

Availability: Published in Progress in Liver Diseases chap23 p395-415. Copies to DDC users only.

Descriptors: (*Military medicine, Hepatitis viruses), (*Hepatitis viruses, South Korea), Virus diseases, Epidemiology, Liver, Biopsy, Etiology, Immune serums, Gamma globulin, Immunity, Medical examination, Hematology, Kidneys, Gastrointestinal system, Liver function tests

Contents: The military problem; immunization; prospective studies; clinical studies; clinical observations; liver function tests; changes in the liver; multiple system involvement; hematologic observations; renal abnormalities; gastrointestinal involvement.

AD-627 338 Fld. 6/5
CFSTI Prices: HC $2.00 MF $0.50
MEDICAL COLL OF VIRGINIA RICHMOND
BURN MORTALITY STUDY OF 1831 PATIENTS.
Interim rept. for Oct 64-Sep 65,
by Max S. Rittenbury, Rhoda W. Maddox, Fred H. Schmidt, William T. Ham,Jr., and Boyd W. Haynes. 22 Nov 65, 46p. Contract DA-49-146-XZ-423
DASA 1687

Unclassified report

Descriptors: (*Burns, Mortality rates), Statistical analysis, Aging (Physiology), Survival, Wounds + injuries, Tolerances (Physiology), Hospitals

The medical histories of 1831 burn patients treated at the Medical College of Virginia during the period 1949 through 1962 have been examined by probit analysis. The mortality rate was compared as related to age, total body surface area of the burn, third degree surface area burned, race, sex, time of admission following the burn injury, and the year of admission. There is a relationship between expected mortality, age and total body surface area of the burn. However, the error in expected mortality indicates a need for a more accurate method of prediction. Time of admission to the hospital following the burn and sex were not important, but the race of the patient is of some importance in predicting eventual outcome of the thermal injury. The LA50 value has been found to be a useful figure to express tolerance of a patient, or a selected group of patients for burn injury. There is a striking difference between the effects of second and third degree burn injuries in that the partial-thickness injury is rarely lethal. (Author)

AD-627 460 Fld. 6/5
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
STUDIES OF NECROSIS IN VITRO OF MOUSE HEPATIC PARENCHYMAL CELLS) ULTRASTRUCTURAL AND CYTOCHEMICAL ALTERATIONS OF CYTOSOMES, CYTOSEGRESOMES, MULTIVESIGULAR BODIES, AND MICROBODIES AND THEIR RELATION TO THE LYSOSOME CONCEPT,
by Benjamin F. Trump, Peter J. Goldblatt, and Robert E. Stowell. 5 Jul 65, 24p.

Unclassified report

Availability: Published in Laboratory Investigation v14 n11 p1946-68 1965. Copies to DDC users only.

Descriptors: (*Necrosis, Cells (Biology)), In vitro analysis, Liver, Tissues (Biology), Cytochemistry, Electron microscopy, Histological techniques, Cytoplasm, Morphology (Biology), Phosphoric monoester hydrolases, Biochemistry, Enzymes, Mice

The alterations in certain cytoplasmic inclusion

bodies--cytosomes, cytosegresomes, microbodies, and multivesicular bodies--in mouse hepatic parenchymal cells were studied by electron microscopy and electron microscopic histochemistry during the development of necrosis in vitro. The alterations in these structures were correlated with biochemical observations of the enzymes acid phosphatase and uricase and discussed in relation to the 'suicide bag' concept of lysosomes.

AD-627 463 Fld. 6/5, 6/13
WALTER REED ARMY INST OF RESEARCH WASHINGTON D C
A CONTRIBUTION TO THE EPIDEMIOLOGY OF ROCKY MOUNTAIN SPOTTED FEVER IN THE EASTERN UNITED STATES,
by Earl L. Atwood, John T. Lamb Jr., and Daniel E. Sonenshine. 1965, 8p. Contract PHS-AI-03218

Unclassified report

Availability: Published in American Journal of Tropical Medicine and Hygiene v14 n5 p831-37 1965. Copies to DDC users only.

Descriptors: (*Rickettsia, Diseases), Ticks, Disease vectors, Epidemiology, Statistical analysis, Ecology, Etiology, Serodiagnosis, Antigens + antibodies, Urban areas, Rural areas, United States, Public health, Population, Virginia

Evidence has been presented which suggests that the true incidence of Rocky Mountain spotted fever is currently much greater than the number of reported cases. An epidemiological study of Rocky Mountain spotted fever in Virginia has also been described. It was observed that the region with the highest rate of disease was the Piedmont. It was also shown that the suburban areas are high risk localities, with only slightly fewer cases than the rural areas. Abandoned land, either abandoned fields or woodland, as well as small rodent activity, was associated with almost all of the cases studied by means of on-site investigations. Currently or previously infected small mammals were present in the immediate vicinity of case locations investigated and were apparently serving as a reservoir of the infectious agent. The manner in which certain trends in land use combine to increase the tick habitat area was discussed, particularly in regard to recent figures on the abandonment of cropland, increase in hardwood forests, and increase in logging activity. (Author)

AD-627 715 Fld. 6/5
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
STUDIES OF MOUSE LIVER NECROSIS IN VITRO. ULTRASTRUCTURAL AND CYTOCHEMICAL ALTERATIONS IN HEPATIC PARENCHYMAL CELL NUCLEI,
by Benjamin F. Trump, Peter J. Goldblatt, and Robert E. Stowell. 5 Jul 65, 32p. Contract E-201

Unclassified report

Availability: Published in Laboratory Investigation v14 n11 p1969-99 1965. Copies to DDC users only.

Descriptors: (*Liver, Necrosis), (*Necrosis, Cytochemistry), Cell structure, Nuclei (Biology), Cytoplasm, Pathology, In vitro analysis, Histological techniques, Electron microscopy, Desoxyribonucleic acids, Mitochondria, Mice

The ultrastructural alterations that occur in hepatic cell nuclei during the processes of cellular death and necrosis produced by incubation of mouse liver slices at 37C are discussed. These alterations are correlated with cytochemical and biochemical studies of deoxyribonucleic acid (DNA) and of certain nuclear enzymes. The results indicate that alterations in nuclear ultrastructure are among the earlist cytologic changes in this system, occurring as early, for example, as disappearance of mitochondrial granules and alterations in the plasmalemma, polysomal dissociation, and depressed incorporation of amino acid polysomes and microsomes. In contrast to alterations in other subcellular systems such as the plasmalemma or the mitochondria, changes in the nucleus, when proper methods of fixation are used, constitute the earliest cytologic change after cell injury demonstrable by light microscopy in this system.

AD-627 755 Fld. 6/5, 6/13
MEDICAL COLL OF SOUTH CAROLINA CHARLESTON DEPT OF SURGERY
PRESERVATION OF CELLULAR VIABILITY OF HUMAN CARTILAGE AT LOW TEMPERATURE,
by Helen L. Braid, Robert F. Hagerty, and William H. Lee Jr., 27 Jul 65, 7p. Contract Nonr-434 (02) Proj. NR-105-088

Unclassified report

Availability: Published in Transplantation v4 n1 p94-9 Jan 1966. Copies to DDC users only.

Descriptors: (*Cartilage, Freezing), (*Cells (Biology), Viability), Preservation, Toxicity, Glycerols, Additives, Metabolism, Vinylpyrrolidone, Polymers, Nitrogen, Liquefied gases

The investigation involves an evaluation of the effects of subzero temperatures on the cellular viability of human costal cartilage. Cellular viability was determined on cartilage frozen at -20C and in liquid nitrogen, with and without the use of the protective additives glycerol and PVP (Polyvinylpyrrolidone). It was found that these additives brought about a significant decrease in the cellular survival of human cartilage at 3C, suggesting an inherent toxicity of the additives and indicating an increase in toxicity with increasing concentration of the agent. Fifteen percent glycerol-saline, 3.5% PVP, 7.5% PVP, and 15% PVP all offer a slight degree of protection against cellular death when cartilage is frozen at -20C. Thirty percent solutions of PVP offer no protection, possibly due to high toxicity. None of the additives afforded any cellular protection during freezing in liquid nitrogen. A profound disruption in cartilage metabolism was indicated after freezing at -20C both with and without a protective medium. (Author)

AD-627 785 Fld. 6/5
LETTERMAN GENERAL HOSPITAL SAN FRANCISCO CALIF
GRANULOMA INGUINALE WITH BONE INVOLVEMENT,
by Paul E. Sieber. 1964, 3p.

Unclassified report

Availability: Published in The Americal Journal of Roentgenology, Radium Therapy and Nuclear Medicine, v95 n2 p515-7 Oct 1965. Copies to DDC users only.

Descriptors: (*Eubacteriales, Diseases), (*Infections, Tissues (Biology)), (*Bone, Infections), Skin, Reproductive system, Diagnosis, Therapy, X rays, Blood counts, Medical examination, Reviews

Granuloma inguinale is a chronic granulomatous infection resulting from invasion by a pleomorphic coccobacillus, Donovania granulomatis. It chiefly involves skin and subcutaneous tissues but also may spread via the blood stream, resulting in osteomyelitic findings roentgenographically; such a case and its treatment is recorded in this paper, including a review of the literature pertaining to this entity. (Author)

AD-627 841 Fld. 6/5, 6/12
CFSTI Prices: HC $1.00 MF $0.50
ARIZONA UNIV TUCSON
ROLE OF COMPLEMENT IN VIVO.
Final rept. 1 Jan 64-30 Jun 65,
by Wayburn S. Jeter. 1 Feb 66, 3p. Contract Nonr-2173 (10) Proj. NR-103-276

Unclassified report

Descriptors: (*Complement, Sensitivity), Antigens + antibodies, In vivo analysis, Immunity

A brief review is given of experimentation toward achieving greater specificity of complement.

AD-627 882 Fld. 6/5, 6/16
CFSTI Prices: HC $1.00 MF $0.50
CALIFORNIA UNIV SAN FRANCISCO MEDICAL CENTER
IMMUNOLOGIC STUDIES IN PULMONARY EMPHYSEMA.
Interim technical rept.,
by Frank M. Privette. Feb 66, 9p. Contract Nonr-222 (51) Proj. NR-105-156
CIC TR-23 ,MR005.12-1200

Unclassified report

Descriptors: (*Lungs, Immunology), (*Immunology, Lungs), (*Respiratory diseases, Immunology), Equines, Blood serum, Tissue extracts, Models (Simulations), Test methods

Of several standard immunological tests employed for determining the immunological affinity of horse sera for a saline extract of horse lung, only the latex fixation test was found applicable. About 30-35% of the sera tested from normal horses and about 60% of the sera tested from emphysematous horses reacted with a horse lung preparation in the latex fixation tes.. Most of these positive sera did not react with normal horse serum when tested in a similar manner, but nearly all of the positive sera which were tested for their reactivity with horse kidney showed positive reactions. The affinity of the sera for the lung extract is removed by absorption with lyophilized horse lung, but not by absorption with normal horse serum nor with lyophilized horse liver or horse kidney. The reactivity of positive sera is reduced by prolonged heating at 56C. There may be some individual tissue antigens which cause some horse sera to react with a lung preparation from a horse of one 'type' but not of another. (Author)

AD-628 006 Fld. 6/5
CFSTI Prices: HC $7.00 MF $1.75
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
OPEN-HEART SURGERY.
5 Nov 65, 332p. Rept. no. FTD-TT-65-660
TT 66-60502

Unclassified report

Unedited rough draft trans. of Akademiya Meditsinskikh Nauk SSSR. Trudy, n7 246p 1961.

Descriptors: (*Surgery, Medical research), (*Heart, Surgery), USSR

Approximately 42 research papers are presented concerning open-heart surgery.

AD-627 275 See Fld. 6/1

AD-627 307 See Fld. 6/20

AD-627 706 See Fld. 6/1

AD-627 766 See Fld. 13

AD-627 894 See Fld. 5/10

AD-627 941 See Fld. 6/16

AD-627 996 See Fld. 6/20

AD-627 999 See Fld. 6/9

6/6. ENVIRONMENTAL BIOLOGY

AD-627 332 Fld. 6/6, 6/18, 12/2
CFSTI Prices: HC $3.00 MF $0.75
GENERAL ELECTRIC CO OKLAHOMA CITY OKLA

A MATHEMATICAL MODEL OF FLASHBLINDNESS.
Final rept. 1 Nov 64-31 Aug 65,
by S. Czeh, Arthur W. Casper, and Ernest C. Segraves,Jr.. Oct 65, 68p. Contract AF41 (609)-2644 Task 630103

Unclassified report

Descriptors: (*Nuclear explosions, Flashblindness), (*Flashblindness, Mathematical models), (*Mathematical models, Flashblindness), Aviation medicine, Vision, Eye, Hazards

In planning certain military missions it is desirable to know the extent to which vision may be impaired by the flashblindness that can result from the intense light of a nuclear explosion. This report describes an attempt to provide assistance to such planning by constructing a mathematical model of flashblindness. The literature was surveyed to determine whether or not the construction of a model was feasible. Using selected data, two equations were developed for predicting recovery time from flash energy, display luminance, and display visual acuity. The prediction errors made were determined in a few situations and compared with the errors made by other prediction techniques. Limitations of the applicability of the equations were noted. (Author)

6/7. ESCAPE, RESCUE AND SURVIVAL

AD-627 436 Fld. 6/7, 17/9
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
INSTALLATION OF A HOMING BEACON IN A FLOTATION VEST FOR CARRIER FLIGHT DECK PERSONNEL.
Memorandum rept.,
by G. E. Hart, F. Mattison, and V. Gagner. 15 Dec 65, 14p. Rept. no. NRL-1668
Proj. BuWeps-WF-019-02-09

Unclassified report

Descriptors: (*Homing devices, Life preservers), (*Life preservers, Radio beacons), (*Radio beacons, Life preservers), Antennas, Flight decks, Naval personnel, Beacons

The latest approved model of flotation vest for carrier flight deck personnel was obtained for instrumentation tests. In the event a man falls overboard, there is a need for a radio beacon to provide a homing signal. The situation calls for a beacon that will not require any cooperative assistance from the victim, who may be unconscious. A miniature beacon is under development at NRL that may provide an effective solution provided a reliable means of turning it on can be developed. A flexible built-in antenna that is completely covered by the fabric of the vest appears to provide a solution to the antenna problem. Radio dark room tests gave very promising results. Tests while floating in salt water will be performed as soon as equipment now under construction is available. (Author)

6/8. FOOD

AD-627 698 Fld. 6/8
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
EFFECT OF TEMPERATURE ON THE MOISTURE BALANCE AND MOISTURE BOND ENERGY IN MACARONI PRODUCTS,
by I. M. Savina, and A. S. Ginzburg. Dec 65, 7p. Rept. no. FSTC-381-T65-646
TT 66-60472

Unclassified report

Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Pishchevaya Tekhnologiya (USSR) n4 (47) p60-2 1965.

Descriptors: (*Food, Moisture), (*Dehydration, Food), USSR, Temperature, Humidity, Adsorption, Processing, Chemical bonds

As the temperature of the drying agent increases with constant relative moisture, the equilibrium moisture of the macaroni decreases and the effect of temperature is felt more when relative humidity is 60 -- 90%. The moisture in macaroni dough is tightly bound to the colloidal component of the dough and at the end of the drying the bound moisture is largely removed by adsorption which requires a certain amount of additional energy. When items are dried to a low moisture level the thermal cycle of the process must include a correction to overcome the energy of the bond between the moisture and the dry matter in the material. (Author)

AD-627 905 Fld. 6/8
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
SANITARY REGULATIONS FOR ENTERPRISES IN THE FRUIT AND VEGETABLE CANNING INDUSTRY,
by M. G. Shevchenko. Dec 65, 16p. Rept. no. FSTC-381-T65-654
TT 66-60493

Unclassified report

Trans. of mono. Sbornik Vazhneyshikh Ofitsialnykh Materialov po Voprosam Gigienii Pitaniya, Moscow 1963 p634-43.

Descriptors: (*Fruits, Processing), (*Vegetables, Processing), Sanitary engineering, USSR, Packaging, Preservation

AD-627 915 Fld. 6/8
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
VITAMINIZED WHEAT AND RYE FLOUR,
by M. G. Shevchenko. Dec 65, 6p. Rept. no. FSTC-381-T65-655
TT 66-60494

Unclassified report

Trans. of mono. Sbornik Vazhneishikh Ofitsialnykh Materialov po Voprosam Gigienii Pitaniya, Moscow, 1963 p604-6.

Descriptors: (*Flour, Vitamins), (*Vitamins, Flour), Wheat, Cereals, Grasses, USSR, Preparation, Specifications, Test methods, Packaging, Labels, Storage, Transportation

Interrepublic technical instructions are being distributed for vitaminized wheat flour, bread baking, macaroni and rye bread baking. Vitaminized flour is standard grade flour after introduction of synthetic vitamins in appropriate assortment and amount. Vitaminization of flour is carried out during treatment of the flour in mills. Vitaminized flour (like standard grade flour) is used for preparation of bread, confectionery and macaroni products, in public nutrition for culinary and household consumption. The report discusses assortment, technical requirements, testing methods, and handling of the flour.

AD-627 290 See Fld. 6/18

6/9. HYGIENE AND SANITATION

AD-627 999 Fld. 6/9, 6/5
CFSTI Prices: HC $4.00 MF $0.75
DEPARTMENT OF THE NAVY WASHINGTON D C
AIR IONIZATION AND ITS HYGIENIC IMPORTANCE,
by A. A. Minkh. 1965, 106p. Rept. no. Translation-628
TT 66-60501

Unclassified report

Trans. of mono. Ionizatsiya Vozdukha i ee Gigienicheskoe Znachenie, Moscow 1958.

Descriptors: (*Air, Gas ionization), (*Hygiene, Atmosphere), (*Gas ionization, Public health), Therapy, USSR, Physiology, Medicine, Reviews

Contents: Biological effects of air ionization; Hygienic importance of air ionization.

6/11. LIFE SUPPORT

AD-627 591 Fld. 6/11
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AEROSPACE CREW EQUIPMENT LAB
EVALUATION OF ROBERTSHAW FULTON CONTROLS COMPANY MODEL 2867A1B AND 2867B1 SAMPLE OXYGEN REGULATORS.
Final rept.,
by Nathan L. Price. 21 Mar 56, 14p. Rept. no. NAMC-ACEL-272 ,TED-NAM-AE-5144

Unclassified report

Descriptors: (*Oxygen masks, Tests), Gas flow

The regulators submitted by Robertshaw Fulton Controls Company were picked at random from production samples of oxygen breathing regulators model 2867A1B and B1. In accordance with request contained in BUAER ltr Aer-AE-51/119 of 14 March 1955, these regulators were submitted for evaluation and determination of their compliance with the performance requirements. The results of testing indicate that the regulators do not fully meet the performance requirements with respect to the 'added oxygen' characteristics. This laboratory has recommended that the regulators be considered as unsatisfactory for service use. In addition it is suggested that the manufacturer review his inspection test procedures relative to the inspection testing of 'added oxygen' requirements for the regulators. (Author)

AD-628 040 Fld. 6/11
CFSTI Prices: HC $1.00 MF $0.50
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
MANNED TESTING OF A SEMIPASSIVE POTASSIUM SUPEROXIDE ATMOSPHERE CONTROL SYSTEM.
Final rept. for Jul 65,
by Donald A. Keating, Konrad Weiswurm, Clemens M.Meyer, George W. Filson, and Irving H. Lantz. Nov 65, 12p. Rept. no. AMRL-TR-65-194
Proj. 6373 Task 637302

Unclassified report

Combined research effort with MSA Research Corp., Gallery, Pa. under contract AF33 (615)-1518.

Descriptors: (*Oxygen equipment, Life support), (*Controlled atmospheres, Tests), (*Life support, Controlled atmospheres), (*Peroxides, Potassium compounds), Manned spacecraft, Feasibility studies, Carbon dioxide, Respiration, Design, Moisture, Absorption, Optimization, Closed ecological systems

A potassium superoxide atmosphere control system using the optimum features of passive and dynamic techniques was man-tested for 24 hours. The results demonstrate the feasibility of using a potassium superoxide system of this design for manned space missions. This semipassive technique is applicable to short missions as well as longer missions. The findings indicate that significant weight, volume, and power savings can be obtained using the semipassive technique as compared to dynamic techniques used in other solid chemical atmosphere control systems. (Author)

AD-627 686 See Fld. 22/1

6/12. MEDICAL AND HOSPITAL EQUIPMENT AND SUPPLIES

AD-627 285 Fld. 6/12, 11/1
WALTER REED ARMY INST OF RESEARCH WASHINGTON D C DIV OF BASIC SURGICAL RESEARCH
THE DEGRADATION OF CYANOACRYLATE TISSUE ADHESIVE. I,
by John L. Cameron, Stephen C. Woodward, Edwin J. Pulaski, H. Kenneth Sleeman, and George Brandes. 12 Feb 65, 8p.
Unclassified report

Availability: Published in Surgery, v58 n2 p424-30 Aug 1965. Copies to DDC users only.

Descriptors: (*Acrylic resins, Degradation), (*Adhesives, Degradation), (*Implants, Acrylic resins), Labelled substances, In vivo studies, Metabolism, Hydrolysis, Formaldehyde, Surgical supplies

Radioactive C14 methyl-2-cyanoacrylate was implanted in rats and its in vivo degradation was studied with the use of radiotracer techniques. The data indicate that the polymer is degraded and radioactive entities are eliminated in the urine and feces. No radioactive entities were found remaining in the tissues and vital organs. A possible mechanism for the degradation of the polymer based on hydrolytic attack at a carbon-carbon bond to produce formaldehyde and resulting chain cleavage is discussed. (Author)

AD-627 691 Fld. 6/12
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
RULES FOR SETTING UP AND TAKING DOWN THE UST-41 AND USB-41 TENTS,
by M. M. Gurvich. Dec 65, 13p. Rept. no. FSTC-381-T65-621
TT 66-60468
Unclassified report

Trans. of mono. Rukovodstvo Dlya Sanitarnykh Tekhnikov, n. p. 1951 p630-8.

Descriptors: (*Tents, Hospitals), (*Hospitals, Tents), Military medicine, Military requirements, Construction, USSR

AD-627 841 See Fld. 6/5

6/13. MICROBIOLOGY

AD-627 279 Fld. 6/13
OLIN MATHIESON CHEMICAL CORP EAST ALTON ILL
THE RELATIONSHIP OF MYCOPLASMA PNEUMONIAE (EATON AGENT) TO STREPTOCOCCUS MG: APPLICATION OF GENETIC TESTS TO DETERMINE RELATEDNESS OF L-FORMS AND PPLO TO BACTERIA,
by Z. A. McGee, M. Rogul, S. Falkow, and R. G. Wittler. 29 Jun 65, 5p. Contract PHS-A1-02332
Unclassified report

Availability: Published in Proceedings of The National Academy of Sciences v54 n2 p457-61 Aug 1965. Copies to DDC users only.

Descriptors: (*Pleuropneumonia-like organisms, Desoxyribonucleic acids), (*Streptococcus, Desoxyribonucleic acids), Mycoplasma, Genetics, Mutations, Antigens + antibodies, Nucleotides, Morphology (Biology), Labeled substances

The DNA from both the Eaton agent (M. pneumoniae) and Streptococcus MG were compared using techniques to determine their nucleotide base ratio and to estimate the extent of any nucleotide base sequence homology. The DNA base compositions were nearly identical, but no evidence of molecular homology between the two was found. This was in marked contrast to a model system of Proteus mirabilis 9 and its stable L-form which have been shown to be indistinguishable in both DNA composition and sequence of nucleotide bases. On the basis of these results it is concluded that M. pneumoniae is not the L-form of Streptococcus MG. (Author)

AD-627 286 Fld. 6/13, 6/1
ILLINOIS UNIV URBANA DEPT OF MICROBIOLOGY
PROPERTIES OF THE DEOXYRIBONUCLEIC ACID OF THE THERMOPHILIC BACTERIOPHAGE TP-84.
Revised ed.,
by Grady F. Saunders, and L. Leon Campbell.
1 Sep 65, 9p. Contract NSF-GB-4 Proj. NR-108 330
Unclassified report

Revision of manuscript submitted 19 Jul 65.

Availability: Published in Biochemistry, v4 n12 p2836-44 Dec 1965. Copies to DDC users only.

Descriptors: (*Bacteriophages, Desoxyribonucleic acids), (*Desoxyribonucleic acids, Bacteriophages), Physical properties, Chemical properties, Molecular properties, Guanine, Nucleotides, Viscosity, Chromatographic analysis, Absorption spectrum, Electron microscopy

The physical and chemical properties of the nucleic acid of the thermophilic bacteriophage TP-84, specific for certain strains of Bacillus stearothermophilus, have been investigated. Phenol -extracted TP-84 DNA has a sedimentation coefficient of 30.0 and a base composition of 42% guanine + cytosine, rho = 1.705 g/cc. The molecular weight of the DNA determined from sedimentation and intrinsic viscosity measurements is 22,600,000 and 22,400,000, respectively. The length of the TP-84 DNA molecules is 13.9 microns, corresponding to a molecular weight of 27,000,000 in the B crystallographic form. Denaturation of TP-84 DNA by heat or alkali results in the formation of two new bands in a CsCl density gradient. Isolation of the L and H strands is accomplished by stepwise elution chromatography on a methylated albumin kieselguhr column. The isolated strands give melting profiles characteristic of single-stranded polynucleotides, are not self-renaturable, and form only one band at rho = 1.705 g/cc after mixing in equimolar quantities and renaturing at 45C for 2 hr. The H and L strands differ in their ultraviolet absorption properties, sedimentation coefficients, and nucleotide compositions. (Author)

AD-627 293 Fld. 6/13
WALTER REED ARMY INST OF RESEARCH WASHINGTON D C DEPT OF MICROBIOLOGY
FACTORS AFFECTING FORMATION OF INCOMPLETE VI ANTIBODY IN MICE,
by Sidney Gaines, Julius A. Currie, and Joseph G. Tully. 17 Apr 65, 9p.
Unclassified report

Availability: Published in Journal of Bacteriology v90 n3 p635-42 Sep 1965. Copies to DDC users only.

Descriptors: (*Immunity, Antigens + antibodies), (*Antigens + antibodies, Mice), Escherichia coli, Salmonella, Bacillus, Erythrocytes, Immune serums, Dosage, Effectiveness

Single immunizing doses of purified Vi antigen elicited complete and incomplete Vi antibodies in BALB/c mice, but only incompletely antibody in Cinnamon mice. Three of six other mouse strains tested responded like BALB/c mice; the remaining three, like Cinnamon mice. Varying the quantity of antigen injected or the route of administration failed to stimulate the production of detectable complete Vi antibody in Cinnamon mice. Such antibody was evoked in these animals by multiple injections of Vi antigen or by inoculating them with Vi-containing bacilli or Vi-coated erythrocytes. The early protection afforded by serum from Vi-immunized BALB/c mice coincided with the appearance of incomplete Vi antibody, 1 day prior to the advent of complete antibody. Persistence of incomplete as well as complete antibody in the serum of immunized mice was demonstrated for at least 56 days after injection of 10 micrograms of Vi antigen. Incomplete Vi antibody was shown to have blocking ability, in vitro bactericidal activity, and the capability of protecting mice against intracerebral as well as intraperitoneal challenge with virulent typhoid bacilli. Production of incomplete and complete Vi antibodies was adversely affected by immunization with partially depolymerized Vi antigens. (Author)

AD-627 371 Fld. 6/13
CFSTI Prices: HC $3.00 MF $0.75
MIDWEST RESEARCH INST KANSAS CITY MO
UNIQUE METHODS OF VIRAL COLLECTION AND IDENTIFICATION.
Final rept. 1 Jun 64-31 Dec 65,
by L. H. Goodson, D. A. Ringle, and J. O. MacFarlane. 31 Dec 65, 70p. Contract AF41 (609)-2439 Proj. AF-7754 ,MRI-2783-B Task 775402
Unclassified report

Descriptors: (*Viruses, Identification), Collecting methods, Biological warfare, Blood cells, Antigens + antibodies, Fluorescent antibody techniques, Phospholipids, Complement, Electrophoresis, Phagocytes, Reticuloendothelial system, In vitro analysis, Immunity, Poliomyelitis virus

In an effort to find new and unique methods for virus collection and identification which would identify fewer than 100 plaque forming units in 6 hr. and be suitable for eventual automation, about 20 possible approaches to the problem were investigated briefly. Special consideration was given to the potential sensitivity and specificity of the methods. Some experiments were conducted with nearly every method in order to assess the potential of the method for meeting the objectives of the study. As a result of this investigation three promising methods of virus identification have been selected and are now recommended for more intensive study: (1) The in vitro reaction of immune white blood cells with antigen to produce cellular changes or lysis which can be monitored microscopically and/or by the measurement of released fluorescent particles or materials. (2) Alteration in the electrical properties of phospholipid bilayer membranes by virus-antibodycomplement complexes. (3) Particle electrophoresis of antibody coated particles for the identification of virus. (Author)

AD-627 461 Fld. 6/13
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C CENTRAL LAB FOR ANATOMIC PATHOLOGY AND RESEARCH
ARTIFACTS SIMULATING CALCIFICATION ASSOCIATED WITH IMPROPERING BUFFERING OF FORMALIN FIXATION,
by Lee G. Luna, and M. Adrian Gross. 1960, 5p.
Unclassified report

Availability: Published in The American Journal of Medical Technology p412-6 Nov - Dec 65. Copies to DDC users only.

Descriptors: (*Histological techniques, Errors), (*Calcification, Histological techniques), (*Buffers, Histological techniques), Formaldehyde, Solutions, Calcium compounds, Chemical precipitation, Acetates, Microstructure

An artifactual deposition of calcium in tissue fixed in formalin buffered with calcium acetate is described in both field and experimental material, and its nature is discussed with particular reference to cell specificity and differentiation from true ante-mortem calcification. (Author)

AD-627 714 Fld. 6/13
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C CARDIOVASCULAR PATHOLOGY BRANCH
EFFECT ON VARIOUS FIXATIVES ON DISSOLUTION AND STAINING CHARACTERISTICS OF ACID MUCOPOLYSACCHARIDES IN HUMAN AORTA,
by Frances M. Sochor. 28 May 65, 4p.
Unclassified report

Availability: Published in The Americal Journal of Clinical Pathology v44 n6 p636-8 Dec 1965. Copies to DDC users only.

Descriptors: (*Histological techniques, Effectiveness), (*Biological stains, Mucopolysaccharides), (*Mucopolysaccharides, Aorta), Solutions, Tissues (Biology), Formaldehydes

Retention of acid mucopolysaccharide (AMP) was evaluated by means of histochemical stains of human aorta after fixation for varying lengths of time in formalin, ethanol, and cetyl pyridinium chloride solutions. No perceptible loss of AMP stainability was observed with the use of formalin or ethanol fixatives. No contraindication to the use of formalin or alcohol fixatives for histologic studies of aortic AMPs was found. Alcohol fixation of tissue predisposed to more intense staining reactions with alcian blue as compared with formalin -fixed tissue. Paraffin embedding increased AMP chromotropism in fixed tissue. (Author)

AD-627 928 Fld. 6/13, 6/19
CFSTI Prices: HC $1.00 MF $0.50
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
MICROBIOLOGIC SAMPLING FOR HUMAN SUBJECTS.
Final rept., June 63-Dec 65,
by Arselus West. Dec 65, 25p. Rept. no.
AMRL-TR-65-192
Proj. AF-7164 Task 716410
Unclassified report

Descriptors: (*Space biology, Microorganisms), (*Microorganisms, Space environmental conditions), (*Astronauts, Hygiene), Bacteria, Fungi, Tolerances (Physiology), Stress (Physiology), Sanitary engineering, Sampling, Culture media, Space simulation chambers, Test methods

The restricted environment of a space vehicle and the stresses of space flight have made necessary the establishment of microbiologic tolerance limits. A graphic outline is presented for the microbiologic sampling of human subjects to determine the composition of their indigenous microflora. The types of microorganisms to be expected and the culture media to be used are given for various body areas. (Author)

AD-627 288 See Fld. 6/15

AD-627 289 See Fld. 6/5

AD-627 339 See Fld. 6/1

AD-627 463 See Fld. 6/5

AD-627 625 See Fld. 6/1

AD-627 755 See Fld. 6/5

6/15. PHARMACOLOGY

AD-627 288 Fld. 6/15, 6/13, 6/3
WALTER REED ARMY INST OF RESEARCH WASHINGTON D C
ENTERITIS AND COLIFORM BACTEREMIA IN GUINEA PIGS GIVEN PENICILLIN,
by W. Edmund Farrar,Jr., and Thomas H. Kent.
6 May 65, 14p.
Unclassified report

Availability: Published in The American Journal of Pathology, v47 n4 p629-42 Oct 1965. Copies to DDC users only.

Descriptors: (*Guinea pigs, Enterobacteriaceae), (*Penicillins, Guinea pigs), Toxicity, Dosage, Intestines, Histology, Morphology (Biology)

The pathogenesis of the fatal illness produced in guinea pigs by a single intramuscular dose of 50,000 units of penicillin G was studied. In the first 12 hours after penicillin administration the total number of culturable organisms (predominantly gram-positive bacteria) in the cecum fell to less than 1 percent of the pretreatment level. Between 24 and 48 hours a 10 -million fold increase in the number of coliform bacteria in the cecum occurred. An even greater increase in the number of anaerobic gram-negative rods was also seen in some animals. These changes in the intestinal flora were accompanied by a severe cecitis, moderate ileitis and acute regional lymphadenitis. A high incidence of bacteremia due to coliform organisms was found in animals that appeared ill. This syndrome could be prevented by the administration of non-absorbable antibiotic agents effective against coliform bacteria. It is believed that this disease is an example of bacterial superinfection induced by alterations in the microbial flora of the intestine, and may prove to be a useful experimental model for the further study of this phenomenon. (Author)

AD-627 473 Fld. 6/15, 6/16
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
REFILLING OF NORADRENALINE STORES IN THE PRENYLAMINE-DEPLETED RABBIT HEART AFTER INJECTION OF OCTOPAMINE AND TYRAMINE,
by U. S. v. Euler, and F. Lishajko. 18 May 65, 5p. Contract AF-EOAR-52-65
AFOSR 65-2051
Unclassified report

Availability: Published in Life Sciences v4 p1421-4 1965. Copies to DDC users only.

Descriptors: (*Amines, Heart), (*Heart, Levarterenol), (*Levarterenol, Biosynthesis), Pharmacology, Dosage, Injection (Medicine), Chromatographic analysis, In vito analysis, Autonomic nervous system, Rabbits, Sweden

The results of the research give further support to the assumption that the amines studied could act partly by being converted to noradrenaline, and not only by releasing performed transmitter. Thus phenylethylamine is about as efficient as tyramine in vitro in releasing transmitter from isolated nerve granules but less active in its refilling action and pharmacological effect. (Author)

AD-627 476 Fld. 6/15, 6/16
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
STEREOSPECIFIC CATECHOLAMINE UPTAKE IN RABBIT HEARTS DEPLETED BY DECABORANE,
by U. S. Von Euler, and F. Lishajko. 1965, 9p.
Contract AF-EOAR-52-65
AFOSR 65-2050
Unclassified report

Availability: Published in International Journal of Neuropharmacology v4 p273-80 1965. Copies to DDC users only.

Descriptors: (*Amines, Heart), (*Heart, Levarterenol), (*Decaboranes, Heart), Pharmacology, Dosage, Injection (Medicine), In vitro analysis, Autonomic nervous system, Rabbits, Sweden

After 80-90 per cent depletion of its noradrenaline (NA) content following decaborane, the rabbit heart may take up both NA and A to the normal capacity upon injection of amines. The amines taken up are well retained for several hours, but gradually disappear in the course of about 20 hr. The high speed sediment and supernatant of a homogenate of the heart contain approximately constant proportions of NA, irrespective of the total amount, indicating a dynamic equilibrium between these pools. When the D- of the L-isomer of A are given together with L-NA, simultaneously and in equal amounts, the uptake of L-A is 2-3 times larger than that of D-A, relative to the uptake of L-NA. This ratio is unchanged over a period of from 1 min-4 hr after the injection of the amine mixture. It is suggested that the uptake is partly stereospecific but that once taken up in the specific stores, the L- and D-isomer are released at approximately the same rate. (Author)

AD-627 752 Fld. 6/15
MICHIGAN UNIV ANN ARBOR DEPT OF PHARMACOLOGY
EFFECTS OF ETHACRYNIC ACID ON RENAL UPTAKE OF MERCURY,
by Robert Z. Gussin, and Edward J. Cafruny. 4 Dec 64, 7p. Contract Nonr-1224 (26) ,PHS-AM-08588
Unclassified report

Availability: Published in The Journal of Pharmacology and Experimental Therapeutics v149 n1 p1-6 1965. Copies to DDC users only.

Descriptors: (*Diuretics, Biochemistry), (*Mercury, Diuretics), (*Kidneys, Mercury), Tissues (Biology), Metabolism, Liver, Proteins, Culture media, Organometallic compounds

Movement of mercury, added as chlormerodrin-Hg203 to a phosphate incubation medium, into renal cortical slices of rat and dog is an active process; it is retarded by lowering temperature of incubation to 4C or by anoxia. Slices of rat renal medulla also actively accumulate mercury but terminal segments of the proximal tubules are included in the slices. Direction of transport (i.e., 'reabsorptive' or 'secretory') is unknown. Ethacrynic acid, a compound which reacts with renal sulfhydryl groups, reduces uptake of mercury into viable and nonviable slices of renal cortex of the dog and rat. Entrance of mercury into slices of renal cortex, renal medulla, and liver, in which proteins have been inactivated by trichloroacetic acid, is reduced when ethacrynic acid is added to incubation media containing the above tissues. The data indicate that ethacrynic acid inhibits active transport of chlormerodrin into renal cortical slices and also reacts chemically with the same tissue constituents (presumably protein-bound sulfhydryl groups) with which the mercurial normally reacts. Thus the mechanism of action of these diuretic agents may be similar. (Author)

AD-627 753 Fld. 6/15
MICHIGAN UNIV ANN ARBOR DEPT OF PHARMACOLOGY
EFFECTS OF ETHACRYNIC ACID ON RENAL PROTEIN-BOUND SULFHYDRYL GROUPS,
by Robert Komorn, and E. J. Cafruny. 6 Oct 64, 7p. Contract Nonr-1224 (26)
Unclassified report

Availability: Published in The Journal of Pharmacology and Experimental Therapeutics v148 n3 p367-72 1965. Copies to DDC users only.

Descriptors: (*Diuretics, Biochemistry), (*Kidneys, Proteins), (*Proteins, Thiols), Cells (Biology), Organometallic compounds, Mercury compounds, Dogs, Rats

Ethacrynic acid reduces the concentration of stainable protein-bound sulfhydryl groups (PBSH) in

renal cells of dogs at a time when diuresis is maximal or increasing. Neither a diuresis nor a reduction of PBSH occurs in rats even when the drug is administered intravenously in doses approximately 100 times as large as those effective in dogs. The data indicate that ethacrynic acid occupies the same chemical 'receptors' and may share the same mechanism of action as mercurial diureties. If reaction of EA with PBSH leads to diuresis, then the site of action of the drug is more extensive than that of mercurials since it lowers PBSH of distal tubular cells as well as PBSH of proximal tubular and collecting duct cells; only the latter two types are influenced when mercurials are used. (Author)

AD-627 842 Fld. 6/15, 6/16, 15/2
CFSTI Prices: HC $1.00 MF $0.50
CHEMICAL RESEARCH AND DEVELOPMENT LABS EDGEWOOD ARSENAL MD
EFFECTS OF PAMC1 AND TMB-4 ON NEUROMUSCULAR TRANSMISSION. II. EFFECTS ON ISOLATED RAT PHRENIC-NERVE DIAPHRAGM-MUSCLE PREPARATION.
Technical rept. Jan 61-Apr 62,
by Joseph H. Fleisher, and Niles R. Ellingson.
Jul 65, 23p. Rept. no. CRDLR-3299
Proj. DA-1C622401A097
Unclassified report

Descriptors: (*Oximes, Neuromuscular transmission), (*Neuromuscular transmission, Oximes), Pyridines, Bromides, Chlorides, Skeletal muscle relaxants, Organic phosphorus compounds, Cholinesterase inhibitors, Curare alkaloids, Ammonium compounds, Physostigmine, Nerves, Diaphragms (Anatomy), Respiration, Rats

The effects of pyridine-2-aldoxime methochloride (PAMC1) and 1,1'-tri-methylene-bis (4-formylpyridinium bromide) dioxime (TMB 4) on neuromuscular transmission in the isolated rat-phrenic-nerve diaphragm preparation were studied in the absence of organophosphate anticholinesterases. Both PAMC1 and TMB-4 antagonized the initial neuromuscular block resulting from addition of depolarizing agents. After prolonged exposure to the latter, the addition of PAMC1 and TMB-4 increased the block in a manner similar to that of d-tubocurarine. Tetraethyl ammonium (TEA) antagonized the depression of response to indirect stimulation following addition of PAMC1. (Author)

AD-627 479 See Fld. 6/16

AD-627 511 See Fld. 6/1

AD-627 574 See Fld. 6/16

AD-627 576 See Fld. 6/3

AD-627 772 See Fld. 6/16

AD-627 843 See Fld. 20/10

AD-627 869 See Fld. 7/3

AD-627 996 See Fld. 6/20

AD-627 997 See Fld. 5/10

6/16. PHYSIOLOGY

AD-627 282 Fld. 6/16
WALTER REED ARMY INST OF RESEARCH WASHINGTON D C
BIOLOGICAL ACTIVITY AND FATE OF TRACE QUANTITIES OF INTRAVENOUS CHROMIUM (III) IN THE RAT,
by Walter Mertz, Edward E. Roginski, and Richard C. Reba. 15 Oct 64, 6p.
Unclassified report

Availability: Published in The American Journal of Physiology v209 n3 Sep 1965. Copies to DDC users only.

Descriptors: (*Chromium compounds, Metabolism), (*Glucose, Metabolism), (*Deficiency diseases, Chromium compounds), Complex compounds, Tracer studies, Labeled substances, Insulin, Adipose tissue, Diet, Dosage, Absorption (Biological), In vitro analysis, Rats

Complexes of trivalent chromium were injected intravenously into rats raised on a low-chromium diet. Two hours after the injection of submicrogram amounts, impaired glucose removal rates were increased to near-normal values. The response of epididymal adipose tissue to insulin in vitro, as measured by the production of C14O2 from labeled glucose, was significantly enhanced in the chromium-injected animals. The amounts required for these effects were approximately 1/10,000 of doses producing acute toxicity. The whole-body disappearance of intravenously injected submicrogram amounts of chromium could be partmental-type analysis revealed at least three regression rates. These rates were unaffected by previous dietary history with regard to chromium and were independent of absolute amounts injected. Intestinal absorption of chromium ranged around a few percent of the dose, regardless of amount applied, and was independent of dietary history. (Author)

AD-627 312 Fld. 6/16
CFSTI Prices: HC $3.00 MF $0.75
RAND CORP SANTA MONICA CALIF
A MATHEMATICAL MODEL OF THE RESPIRATORY CONTROLLER,
by T. W. Murphy. Jan 66, 61p. Rept. no. P-3300
Unclassified report

Descriptors: (*Respiratory system, Mathematical models), (*Carbon dioxide, Respiration), Oxygen, Gas flow, Blood circulation, Cardiovascular system, Lungs, Blood vessels, Tissues (Biology), Diffusion, pH, Equilibrium, Aorta, Relaxation (Physiology), Hypoxia

A mathematical model of the respiratory controller is presented. In an attempt to improve current formulations, details previously neglected are incorporated. However, the model is not stable because the allowance for diffusion in tissue was neglected. A subsequent report will evaluate a model incorporating this feature and also an analysis of a model space of the respiratory controller. It is concluded that diffusion parallel to the blood flow axis is an important process in the exchange of gases between blood and tissue. (Author)

AD-627 340 Fld. 6/16, 5/10
ARMY MEDICAL RESEARCH LAB FORT KNOX KY EXPERIMENTAL PSYCHOLOGY DIV
RELIABILITY OF HIGH-FREQUENCY THRESHOLDS,
by John L. Fletcher. 15 Oct 65, 12p. Proj. DA-3A014501B74C Task DA3A014501B74C-00
USAMRL 646
Unclassified report

Availability: Published in The Journal of Auditory Research, v5 p133-7 1965. Copies to DDC users only.

Descriptors: (*Audiometry, High frequency), Auditory perception, Thresholds (Physiology), Hearing, Correlation techniques, Reliability

In order to ascertain reliability of high-frequency threshold (up to 18,000 cps) 15 young (18-25) normal males were tested three different times at frequencies from 4 - 18,000 cps on a specially constructed audiometer. Those data for the same people were compared with data at 4, 6, and 8000 cps obtained using a Rudmose ARJ-5 audiometer. In general, correlations for higher frequencies were greater than for lower frequencies, and the special audiometer thresholds were more reliable than those from the ARJ-5. The low correlation between the two instruments tended to reflect the lower reliability of thresholds obtained using the ARJ-5. (Author)

AD-627 479 Fld. 6/16, 6/15
CFSTI Prices: HC $1.00 MF $0.50
GENOA UNIV (ITALY) CLINICA NEUROCHIRURGICA
RELATION BETWEEN BRAIN STEM AND ELECTROCORTICAL ACTIVITY.
Final scientific rept.,
by Gian Franco Rossi. 30 Sep 65, 12p. Contract AF-EOAR-4-65
AFOSR 65-2012
Unclassified report

Descriptors: (*Brain, Electrophysiology), (*Electroencephalography, Sleep), (*Cerebral cortex, Stimulation), (*Barbiturates, Brain), Vision, Thresholds (Physiology), Pain, Cranial nerves, Paralysis, Epilepsy, Analgesics + antipyretics, Humans, Rabbits, Cats, Italy

Results are summarized of research on the relations between brain stem, electrocortical activity and level of consciousness. The findings are subdivided into seven groups. The body of the research was performed in man: the relation between EEG patterns and depth of sleep, the relation between cerebral potentials evoked by visual stimuli, EEG patterns and degree of awareness, and the electrocortical and behavioral effect of selective barbiturization of the brain stem and frontal brain were studied. Experimental research was performed in the rabbit to check some of the observations made in man. Other experiments were made in cats to study the sleep inducing effect of electrical stimulation of the cerebral cortex and the influence of the different phases of sleep on the EEG epileptic activity. Finally, the mode of action of a new analgesic drug was experimentally analyzed in the rabbit. (Author)

AD-627 493 Fld. 6/16
GOTEBORG UNIV (SWEDEN) DEPT OF PHARMACOLOGY
MAPPING OUT OF CATECHOLAMINE AND 5-HYDROXYTRYPTAMINE NEURONS INNERVATING THE TELENCEPHALON AND DIENCEPHALON,
by Nils-Erik Anden, Annica Dahlstrom, Kjell Fuxe, and Knut Larsson. 16 Apr 65, 6p. Contract AF-EOAR-56-65 ,NIH-NB-05236-01
AFOSR 65-2044
Unclassified report

Prepared in cooperation with Goteborg Univ. (Sweden).

Availability: Published in Life Sciences, v4 n13 p1275-9 1965. Copies to DDC users only.

Descriptors: (*Amines, Nerve cells), (*Brain, Amines), Central nervous system, Histological techniques, Biochemistry, Chromatographic analysis, Rats, Sweden

By means of electrolytic lesions in various parts of the prosencephalon in rats and subsequent histochemical and biochemical analysis final evidence has been obtained for the view that the vast majority of 5-hydroxytryptamine and catecholamine terminals in the prosencephalon belong to special neurons with their cell bodies in the lower brain stem. A large part of the cell bodies are localized in the mesencephalon and the 5-hydroxytryptamine and noradrenaline axons ascend, to a large extent, in the medial forebrain bundle. (Author)

AD-627 510 Fld. 6/16
CFSTI Prices: HC $1.00 MF $0.50
HEMODYNAMICS RESEARCH INC MORRISTOWN N J
WORK ACCOMPLISHED BY HEMODYNAMICS RESEARCH, (1964-1965).
Final rept. 15 Jun 64-14 Jun 65,
by Robert A. Kuhn. 1965, 9p. Contract Nonr-

4484 (00) Proj. RR-009-01-01 ,NR-062-343
Unclassified report

Descriptors: (*Blood circulation, Medical research), Aorta, Models (Simulations), Arteries, Construction, Laminar flow, Silicone plastics, Geometric forms

Using a pressure gun and cartridges of liquid silicone, the aortal systems of freshly-killed calves were injected under physiological pressures. The injected material attained a permanent set within minutes, allowing dissection and removal of the entire system. Artery walls were removed by corrosion. The resultant casts -- the first precise geometric models of the animal aortal system -- showed a number of heretofore unpublished characteristics, i.e., the orifices of segmentally distributed arteries are elliptical in shape with rostral, gradually deepening troughs. The aorta itself shows a characteristic distrotion at the junction of the previously existent ductus arteriosus. The influence of these peculiarities upon blood flow within the system is at present being investigated. (Author)

AD-627 548 Fld. 6/16, 6/20
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
EFFECT OF NICOTINE AND NICOTINE ANALOGUES ON TISSUE AND URINARY CATECHOLAMINES IN THE RAT,
by T. C. Westfall. 22 Apr 64, 7p. Contract PHS-HE-A-331-01 ,AF-EOAR-31-64
AFOSR 65-2522
Unclassified report

Availability: Published in Acta Physol. Scand. v63. Copies to DDC users only.

Descriptors: (*Alkaloids, Tissues (Biology)), (*Urine, Amines), (*Amines, Excretion), (*Levarterenol, Tissues (Biology)), Autonomic nervous system, Epinephrine, Dosage, Rats, Sweden

The time response pattern of nicotine and the nicotine analogue 3-pyrrolidino-methylpyridine (W-16) on the noradrenaline (NA) content of heart, spleen kidney and liver was studied following intraperitoneal administration in rats. It was found that both compounds produced a transient but significant decrease. Nicotine produced an effect that was visible within 5 min with the NA content returning to control levels in 60-180 min. Although quantitatively different, W-16 produced an effect qualitatively similar to nicotine. The effect of nicotine and several nicotine analogues on the 24-hour urinary excretion of catecholamines was also studied in rats. Three out of four analogues investigated produced a slight increase in the excretion of adrenaline (A) and NA at high dose levels (5-10 mg/kg). At a dose of 1 mg/kg, nicotine produced a significant increase in the 24 hour urinary excretion of A but not NA. (Author)

AD-627 549 Fld. 6/16
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
FREE AND BOUND NORADRENALINE IN THE RABBIT HEART,
by U. S. von Euler, and F. Lishajko. 1964, 4p.
Contract AF-EOAR-31-64
AFOSR 65-2523
Unclassified report

Availability: Published in Nature, v205 n4967 p179-80 9 Jan 1965. Copies to DDC users only.

Descriptors: (*Levarterenol, Heart), (*Autonomic nervous system, Levarterenol), Nerve cells, Equilibrium, Solvent extraction, Rabbits, Sweden

The results show that the proportion of vesicle-bound NA in the terminal parts of the axons is considerably higher than that in the pre-terminal parts and that the proportions of NA in the high-speed sediment and in the soluble fractions of the homogenized rabbit heart are approximately constant and independent of the total amount of NA in the organ, suggesting a state of equilibrium between these fractions.

AD-627 551 Fld. 6/16
GOTEBORG UNIV (SWEDEN)
FURTHER EVIDENCE FOR THE PRESENCE OF NIGRO-NEOSTRIATAL DOPAMINE NEURONS IN THE RAT,
by Nils-Eric Anden, Annica Dahlstrom, Kjell Fuxe, and Knut Larsson. 1964, 7p. Contract AF-EOAR-30-64 ,PHS-NB-02854-04
Unclassified report

Availability: Published in The American Journal of Anatomy, v116 n1 p329-33 Jan 1965. Copies to DDC users only.

Descriptors: (*Nerve cells, Amines), (*Amines, Nerve cells), Brain, Histological techniques, Fluorescence, Central nervous system, Nerve fibers, Nuclei (Biology), Degradation, Sweden

With the help of the highly specific and sensitive histochemical fluorescence method of Falck and Hillarp for the cellular demonstration of monoamines the catecholamine-containing cell-bodies within the brain stem have been studied after unilateral removal of a large part of the neostriatum 1 to 28 days after the operation. Most of the catecholamine-containing cellbodies within the substantia nigra -- but no other monoamine-containing cell-bodies -- appeared to be distinctly increased in fluorescence intensity and somewhat swollen 2 to 4 days after operation while after 3 to 4 weeks they showed a marked to very marked decrease in fluorescence intensity together with marked degenerative changes. Parallel with the changes in the cell-bodies there occurred a rapid and marked accumulation of catecholamines within very abundant swollen nerve fibers in the internal capsule. These nerve fibers were traced caudally via the retrolenticular part of the internal capsule down to the crus cerebri. These results together with those in a previous paper (Anden, Carlsson, Dahlstrom, Fuxe, Hillarp and Larsson, '64) seem to provide conclusive evidence for the presence of nigroneostriatal dopamine neurons. (Author)

AD-627 574 Fld. 6/16, 6/15
CFSTI Prices: HC $1.00 MF $0.50
MICHIGAN UNIV ANN ARBOR
RENAL TUBULAR MECHANISMS.
Final rept., 1 Jan 63-31 Aug 64,
by Edward J. Cafruny, Robert Gussin, and Robert Komorn. 31 Aug 64, 12p. Contract Nonr-1224 (26) Proj. NR-303-424
Unclassified report

Descriptors: (*Kidneys, Physiology), (*Diuretics, Kidneys), Permeability, Drugs, Transport properties, Secretion, Absorption (Biological), Mercury compounds, Excretion, Glucose, Hemoglobin, Pharmacology, Fishes, Dogs, Monkeys, Rats, Abstracts

The objectives of the research were: (1) To use the kidney as a model for studying transport of drugs into and out of cells. (2) To determine whether active transport of certain drugs is essential for pharmacological activity. (3) To study the secretory and reabsorptive mechanisms of kidney. (4) To determine whether renal accumulation and resultant activity of various diuretic substances are dependent on active transport.

AD-627 621 Fld. 6/16
LUND UNIV (SWEDEN) DEPT OF PHARMACOLOGY
POTASSIUM INDUCED RELEASE OF TRANSMITTER AT THE HUMAN NEUROMUSCULAR JUNCTION,
by Dan Elmqvist. 6 Nov 64, 8p. Contract AF-EOAR-12-63 Proj. AF-9777 Task 977701
AFOSR 65-2515
Unclassified report

Availability: Published in Acta Physiol. Scand. p1-6 1965. Copies to DDC users only.

Descriptors: (*Neuromuscular transmission, Acetylcholine), (*Potassium, Neuromuscular transmission), Potassium compounds, Chlorides, Magnesium, Calcium, Ions, Muscles, Skeletal muscle relaxants

When the release of ACh quanta from the human intercostal motor nerve terminals, recorded as miniature end-plate potentials (m.e.p.p.s), was enhanced by raising the potassium ion concentration, the increased rates were only sustained if release rates were limited to not more than 150 m.e.p.p.s/sec either by not using higher concentrations of KCl than 30 mM, or by reducing release with increased magnesium and lowered calcium concentrations when higher potassium ion concentrations were used. If higher rates of release were allowed to occur in the presence of 40 to 50 mM KCl, the release rates subsequently declined to very low levels. The total number of quanta released by 40 or 50 mM KCl corresponded to the amount of ACh estimated to be present in the motor nerve terminals. (Author)

AD-627 634 Fld. 6/16, 6/3
CFSTI Prices: HC $1.00 MF $0.50
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
COMPARATIVE NEUROPHYSIOLOGY OF VISION.
Technical (Final) rept. 15 Sep 64-14 Sep 65,
by Giuseppe Moruzzi. 15 Sep 65, 10p. Contract AF-EOAR-37-64
AFOSR 65-2011
Unclassified report

Descriptors: (*Vision, Physiology), (*Coleoptera, Vision), (*Photosensitivity (Biological), Coleoptera), (*Sleep, Electroencephalography), Electrophysiology, Nervous system, Inhibition, Stimulation, Nerve cells, Light, Adaptation (Physiology), Optic nerve, Cats, Italy

The results of the following themes of investigation are reported: (1) Visual control of flashing in fireflies. (2) Presynaptic inhibition in cat's lateral geniculate body. (3) Influence of sleep and wakefulness on the response of lateral geniculate units to sinewave photic stimulation. (4) Effects of synchronized sleep on the response of lateral geniculate units to flashes of light. (Author)

AD-627 746 Fld. 6/16
LUND UNIV (SWEDEN)
LOCALIZATION OF NEURONAL MONOAMINES AT THE CELLULAR LEVEL,
by Ch. Owman, and B. Falck. 1965, 22p. Contract AF-EOAR-61-44 ,PHS-B-02854
AFOSR 65-2844
Unclassified report

Availability: Published in Pharmacology of Cholinergic and Adrenergic Transmission, International Pharmacological Meeting, Prague 20-23 Aug 1963. Copies to DDC users only.

Descriptors: (*Amines, Nerve cells), Levarterenol, Epinephrine, Fluorescence, Electron microscopy, Autonomic nervous system, Tissues (Biology), Nerves, Neuromuscular transmission, Serotonin, Sweden

Four biogenic monoamines, namely noradrenaline, adrenaline, dopamine, and 5-hydroxytryptamine, were localized intraneuronally. In all species so far examined, whether vertebrates or invertebrates, the different neurons in which these monoamines occur possess some important features in common. When reaching the innervation structures, the terminal part of the axons are provided with varicosities showing an intense fluorescence, suggesting a high accumulation of the amines at this site. In a recent electron microscopic study with use of serial sections, Elfvin (1963) has pre-

sented direct evidence that these varicosities establish the synaptic contacts. The rest of the neurons, including the cell bodies, show only a weak fluorescence, and obviously these parts contain only low amounts of monoamines compared to the terminal varicose part. This is in agreement with von Euler (1956, 1961), who presented strong evidence that noradrenaline in noradrenergic nerves is stored in high concentrations in the terminal part of the axon. In many instances yellow- and green-fluorescent preterminal fibres cannot be seen in normal tissues, but appear after the administration of nialamide. This effect of nialamide suggests that monoamine oxidase is present in the whole adrenergic neuron.

AD-627 757 Fld. 6/16
GENOA UNIV (ITALY) CLINICA NEUROCHIRURGICA
EXCITABILITY CYCLE OF THE VISUAL CORTEX DURING SLEEP AND WAKEFULNESS,
by Mario Palestini, Mario Pisano, Guido Rosadini, and Gian Franco Rossi. 29 Dec 64, 9p.
Contract AF-EOAR-11-64
AFOSR 65-2837

Unclassified report

Availability: Published in Electroencephalography and Clinical Neurophysiology v19 p276-83 1965. Copies to DDC users only.

Descriptors: (*Cerebral cortex, Excitation), (*Vision, Sleep), Electroencephalography, Italy, Cats

The excitability cycle of the visual cortex of intact unanesthetized cats was studied during the states of wakefulness, sleep with EEG synchronization and sleep with EEG desynchronization. The study was made by analysing the relative amplitudes of the two potentials evoked in the visual cortical area by two identical stimuli to the optic radiations, separated by a variable time interval. The excitability of the visual cortical neurons is higher during sleep than during wakefulness; no significant differences are found between the two phases of sleep. The phenomenon is tentatively interpreted by assuming that during sleep the cerebral cortex is released from an inhibitory influence exerted by the reticular activating system. The fluctuations of cortical excitability during synchronized sleep might be due to the varying of the synchronizing thalamo-cortical circuits; its relative stability during desynchronized sleep might be ascribed to an ascending hypnogenic brain-stem influence. Different cortical areas might show different excitability changes during sleep and wakefulness; the excitability changes of the thalamus seem to be partially different from those of the cerebral cortex. (Author)

AD-627 772 Fld. 6/16, 6/1, 6/15
MICHIGAN UNIV ANN ARBOR DEPT OF PHYSIOLOGY
ETHACRYNIC ACID: DIURETIC PROPERTY COUPLED TO REACTION WITH SULFHYDRYL GROUPS OF RENAL CELLS,
by Robert M. Komorn, and Edward J. Cafruny.
7 Oct 63, 1p. Contract Nonr-1224 (26)

Unclassified report

Availability: Published in Science v143 n3602 p133-4 Jan 10 1964. Copies to DDC users only.

Descriptors: (*Diuretics, Chemical properties), (*Proteins, Kidneys), (*Kidneys, Diuretics), Thiols, Chlorine compounds, Excretion, Cells (Biology)

Ethacrynic acid, injected intravenously after surgical removal of one kidney of anesthetized dogs, lowered the concentration of protein-bound sulfhydryl groups in cells of the remaining kidney. Chloride excretion and urinary output of the kidney exposed to the drug increased. These findings indicate that the diuresis produced by ethacrynic acid may be related to its capacity for binding sulfhydryl groups of renal cellular proteins. (Author)

AD-627 810 Fld. 6/16, 6/1
CFSTI Prices: HC $6.00 MF $1.25
LEVER BROTHERS CO EDGEWATER N J
BASIC STUDIES IN PERCUTANEOUS ABSORPTION.
Rept. no. 10 (Final comprehensive) Jan 61-Dec 65,
by Leonard J. Vinson, Thomas Masurat, and Edward J. Singer. Dec 65, 229p. Contract DA-18-108-CML-6573

Unclassified report

See also AD-619 960.

Descriptors: (*Skin, Absorption (Biological)), (*Absorption (Biological), Skin), Biochemistry, Membranes (Biology), Permeability, Diffusion, Histology

Contents: Characterization of the skin barrier, Alteration in skin barrier properties, Enhancement of the barrier, Ultrastructure of normal and altered skin, The diffusion of water through skin model membranes.

AD-627 872 Fld. 6/16
DEFENCE CHEMICAL BIOLOGICAL AND RADIATION LABS OTTAWA (ONTARIO)
THE USE OF SMALL SKIN SURFACE AREAS FOR WHOLE BODY SWEATING ASSESSMENT,
by Arthur C. Custance. 2 Mar 65, 8p. Rept. no. DCBRL-468

Unclassified report

Availability: Published in Canadian Journal of Physiology and Pharmacology v43 p971-7 1965. Copies to DDC users only.

Descriptors: (*Perspiration, Measurement), (*Skin, Perspiration), Body weight, Sweat cooling, Surface area, Exercise, Clothing, Monitors, Moisture, Humidity, Atropine, Correlation techniques

It is possible to obtain a continuous record of the sweating rate of an active subject by monitoring changes in total body weight. However, elaborate equipment is required that is capable of accomodating the tredmill (or other exercising device) as well as the subject. The balance must be rugged enough to withstand the movements of the subject, yet sensitive enough to respond to small changes in weight. It would be a great convenience to be able, instead, to monitor small representative areas of the skin surface with confidence that they faithfully reflect whole body reactions. In this research, moisture loss from a representative area of the skin of the dorsum under a capsule covering 14 sq. cm was measured by an apparatus which automatically altered the flow of dry air to keep the humidity of the effluent constant. In four subjects exercising on a tredmill at 3.5 m.p.h. the correlation coefficient between the area under the curves so obtained and the total body weight loss was very high (more than 0.93), and there was also good correlation after sweating was partially suppressed by atropine. Short-period fluctuations were simultaneous and highly correlated between bilaterally symmetrical areas of skin. It is concluded that moisture loss from a single area of skin can be used to represent changes in the rate and pattern of sweating of the whole body. (Author)

AD-627 913 Fld. 6/16
LUND UNIV (SWEDEN)
NEW ASPECTS OF THE MAMMALIAN PINEAL GLAND. I. FUNCTIONAL SIGNIFICANCE OF FETAL PINEAL GLAND OF RAT. II. MONOAMINE STORES IN MAMMALIAN PINEAL GLAND.
by Christer Owman. 1964, 39p. Contract AF-EOAR-5-64
AFOSR 65-2512

Unclassified report

Availability: Published in ACTA Physiologica Scandinavica v63 suppl 240 pl-40 1964. Copies to DDC users only.

Descriptors: (*Endocrine glands, Embryos), (*Amines, Endocrine glands), Cerebrum, Physiology, Mammals, Secretion, Histology, Morphology (Biology), Metabolism, Excision, Nerve cells, Photoreceptors, Autonomic nervous system, Cytology, Adults, Rats, Sweden

The findings of the secretory activity of the pineal gland prenatally on one hand, and of the monamine stores in the pineal gland postnatally on the other, indicates the possibility of a two-fold functional significance of the pineal gland in one and the same animal during two different phases of life. Similar dual functions have been suggested to occur in the development of the pineal complex in lower vertebrates. Thus, in certain land-living anura the pineal complex is dominated by the frontal organ, probably exerting a photoreceptor function. In adult stages the frontal organ is reduced, while the epiphyseal portion shows up as a well-developed glandular structure (OKSCHE 1955). Similarly, the pineal organ of the newt undergoes a characteristic change in cytology, from highly differentiated photoreceptor-like cells during larval stages, into cells with morphologic signs of secretory activity culminating in adult stages. This conversion probably denotes a basic shift in function of the organ (Kelly 1962, 1963). (Author)

AD-627 933 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
GENICULATE UNIT RESPONSES TO SINE-WAVE PHOTIC STIMULATION DURING WAKEFULNESS AND SLEEP,
by Lamberto Maffei, Giuseppe Moruzzi, and Giacomo Rizzolatti. 9 Apr 65, 1p. Contract AF-EOAR-37-64
AFOSR 65-2966

Unclassified report

Availability: Published in Science v149 n3683 p563-4 30 Jul 1965. Copies to DDC users only.

Descriptors: (*Nerve cells, Stimulation), (*Nerve impulses, Electroencephalography), (*Sleep, Nerve impulses), Brain, Light, Ganglia, Retina, Oscillation, Photosensitivity (Biological), Cats, Italy

The oscillation in firing rate of units of the lateral geniculate body in response to stimulation with sine-wave light was studied in unanesthetized cats with the brainstem sectioned immediately in front of the fifth nerve (pretrigemical preparation). During wakefulness, as indicated by behavior and by electroencephalograms, the time course of the oscillation in firing rate followed very closely the change in intensity of sine-wave light. During synchronized sleep there was no such relationship. (Author)

AD-627 941 Fld. 6/16, 6/5
BRUSSELS UNIV (BELGIUM)
OLIVO-COCHLEAR FUNCTION IN A DEAF ALBINO CAT,
by J. E. Desmedt. 1963, 2p. Contract AF-EOAR-57-65
AFOSR 65-2968

Unclassified report

Availability: Published in Acta-Oto-Laryng. v59 p168-9. Copies to DDC users only.

Descriptors: (*Deafness, Physiology), (*Nervous system, Deafness), Ear, Pathology, Nerve cells, Ganglia, Auditory nerve, Nerve fibers, Stimulation, Strychnos alkaloids, Cats, Belgium

AD-627 947 Fld. 6/16
PARMA UNIV (ITALY) INST OF HUMAN PHYSIOLOGY
REGISTRAZIONE DELL'ATTIVITA' NELLE VIE OTTICHE CENTRALI (RECORDING ACTIVITY IN THE CENTRAL VISUAL PATHWAYS),
by A. Arduini, and G. Rizzolatii. 17 Apr 64, 9p.

Contract AF-EOAR-38-64 Proj. AF-9777 Task 977701
AFOSR 65-2967

Unclassified report

Availability: Published in Bollettino della Societa Italiana di Bologia Sperimentale v40 n15 p885-8 1965. Copies to DDC users only.

Descriptors: (*Vision, Nervous system), Brain, Nerve impulses, Stimulation, Cats, Italy

Activity in the retinogeniculate, geniculocortical, and corticothalamic pathways has been compared in cats with mid-pontine and rostro-pontine pretrigeminal sections. An electrode was inserted into the optic chiasma and used to stimulate the cat with rectangular impulses. Evoked responses were recorded with a bipolar electrode consisting of two 0.1 mm diameter copper wires in an uninsulated 0.5 mm of two 0.1 mm diameter copper wires in an uninsulated 0.5 mm diameter steel tube. Evoked potentials in the corticifugal pathways not previously recorded with macroelectrodes were recorded with this electrode. The authors have shown that it is possible to record activity in the corticothalamic and thalamocortical projections selectively when the activity is represented as a discharge of impulses, rather than as evoked potentials. (Author)

AD-627 952 Fld. 6/16
FREIE UNIVERSITAET BERLIN (WEST GERMANY) PHYSIOLOGISCHES INSTITUT
UNTERSUCHUNGEN ZUR FRAGE DER HUMORALEN AUSLOSUNG DER BADEDIURESE. (A HUMORAL FACTOR RESPONSIBLE FOR IMMERSION DIURESIS),
by H. J. Von Linkenbach, D. Kaiser, P. Eckert, and O. H. Gauer. 1964, 3p. Contract AF-EOAR-65-63 Proj. AF-9777 Task 977701 AFOSR 65-2965

Unclassified report

Text in German.

Availability: Published in Pflugers Archiv fur die gesamte Physiologie v279 1964. Copies to DDC users only.

Descriptors: (*Urinary system, Physiology), Diuretics, West Germany, Blood serum, Humans

Diuresis was induced in human subjects by maintaining them in a horizontal position and/or immersing them in a neutral-temperature water bath, and their sera were tested for diuretic activity on alcohol-anesthetized rats. The sera from 'Fasting-sitting' subjects usually showed no or very slight anti-diuretic effect, but the sera from the horizontal and immersed subjects caused a 20-80% increase in diuresis. A quantitative relationship between this rise in diuresis and the subject's urine volume at the time of blood withdrawal was not found. After standing at room temperature for 20 hours, the diuretic immersion serum usually showed a considerable decrease in efficacy (ranging to total loss of effectiveness), while its effect was generally preserved after standing at 2-4C for the same length of time. This probably implies the participation of a thermolabile diuretic substance in immersion diuresis. (Author)

AD-627 473 **See Fld. 6/15**

AD-627 476 **See Fld. 6/15**

AD-627 576 **See Fld. 6/3**

AD-627 842 **See Fld. 6/15**

AD-627 882 **See Fld. 6/5**

AD-627 894 **See Fld. 5/10**

AD-628 041 **See Fld. 6/19**

6/17. PROTECTIVE EQUIPMENT

AD-627 592 **See Fld. 17/8**

6/18. RADIOBIOLOGY

AD-627 290 Fld. 6/18, 6/8
WALTER REED ARMY MEDICAL CENTER WASHINGTON D C
NEUTRON-INDUCED RADIOPHOSPHORUS-32 IN FOOD.
Revised ed.,
by Stanley N. Wampler, Mary K. Ellis, and Robert H. Yager. 8 Jan 65, 4p.

Unclassified report

Revision of manuscript submitted 16 Oct 64.

Availability: Published in Health Physics v11 p1043-6 1965. Copies to DDC users only.

Descriptors: (*Radiological contamination, Food), (*Irradiated foods, Radiation measurement systems), (*Radiation hazards, Irradiated foods), Neutron flux, Radioactive isotopes, Half life, Radioactivity, Radiation tolerance, Nuclear weapons

The problem of evaluating the hazards of radioactivities induced in foods is to find a means to measure the exposure of the foods, then to apply the exposure value to activation equations, calculate the levels of activity expected from each isotope, summate these activities and calculate a hazard value. The effort of this experiment was directed toward reproducibility of activation measurements over wide ranges of neutron flux levels. The results indicate this is feasible. The ideal system would be one activity measurment which could give a very close approximation of the hazard without the laborious calculations. It appears that 32P approaches the indicator system requirements. However, further studies of other induced activities are required to see if correlation exists.

AD-627 292 Fld. 6/18, 6/3
WALTER REED ARMY MEDICAL CENTER WASHINGTON D C
RADIATION-INDUCED PREMATURE AGING IN LEAVES AND AUTUMNAL EVENTS IN NATURE,
by Adolph T. Krebs. 30 Mar 65, 21p.

Unclassified report

Availability: Published in Beitrage zur Biologie der Pflanzen v41 p157-74 1965. Copies to DDC users only.

Descriptors: (*Radiobiology, Aging (Physiology)), (*Aging (Physiology), Radiation effects), (*Plants (Botany), Radiation effects), Colors, Periodic variations, Organic pigments, Metabolism, Chlorophylls, Radiological dosage, Mammals, Growth substances

In considering the reported findings in plants, plant cells and leaves and relating them to present botanical theories on aging of plant systems in autumn and to existing hypotheses and theories on radiation 'aging' and natural aging in mammals, it becomes evident that there are bridges connecting 'early' and natural fall events. As in mammalian radiobiology, where radiation 'aging' and spontaneous aging share certain basic mechanisms, so also here in the plant kingdom radiation-induced aging and natural aging have a common denominator. Final proof of this relationship and confirmation of the role of auxin in the aging process and in radiobiological phenomena would be a valuable contribution to the discussions on aging, and would demonstrate at the same time the stimulus and impetus of the auxin studies in the late twenties and early thirties on further research in botany, radiobiology and gerontology.

AD-627 569 Fld. 6/18
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
SYSTEMIC FACTOR IN RECOVERY OF RAT KIDNEY FROM X IRRADIATION: THYMIDINE-H3 INCORPORATION STUDIES,
by Louis W. Wachtel, Theodore L. Phillips, and Leonard J. Cole. 13 Dec 65, 25p. Rept. no. USNRDL-TR-945
NAVMED MR005.08-1200-7

Unclassified report

Descriptors: (*Kidneys, Radiation effects), (*Radiation effects, Kidneys), X rays, Thymidines, Tritiated compounds, Autoradiography, Whole body irradiation, Partial body irradiation, Radiological dosage, Body, Growth, Mitosis, Recovery, Rats

The effect of X irradiation on thymidine-H3 incorporation into kidney cells (thymidine index) was measured at 4-8 hour intervals up to 96 hours in unilaterally nephrectomized female weanling rats. A sharp drop in the thymidine index occurred during the first 16 hours after the kidney only was irradiated with 1000 rad, and also after the kidney was irradiated with 125 rad or 500 rad at the same time the body received 500 rad. Irradiation of the body, but with the kidney completely shielded had no apparent inhibitory effect on kidney thymidine incorporation. The ability of the irradiated kidney to incorporate thymidine reappeared in 24 hours if the remainder of the body was not irradiated. When both the body and the kidney were irradiated, recovery of thymidine uptake depended on the amount of radiation received by each. An explanation for the above observations is offered on the basis of a postulated systemic factor, the formation or induction of which could be affected by radiation and which is essential for thymidine incorporation in the kidney. (Author)

AD-627 862 Fld. 6/18, 6/1
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE WEAPONS LAB KIRTLAND AFB N MEX
EFFECTS OF RADIATION ON SOME SERUM ENZYMES AND TRACE ELEMENTS IN LARGE ANIMALS.
Technical rept.,
by William S. Riggsby, Norman D. Jones, and William R. Godden. Jan 66, 38p. Rept. no. AFWL-TR-65-112
Contract AF29 (601)-62-5217 Proj. AF-7801 Task 780104

Unclassified report

Descriptors: (*Radiation effects, Mammals), (*Enzymes, Radiation effects), (*Labeled substances, Radiation effects), Oxidoreductases, Transferases

This report summarizes the results of determinations of serum zinc, copper, malic dehydrogenase (MDH), lactic dehydrogenase (LDH), glutamic-oxalacetic transaminase (SGOT), and glutamic-pyruvic transaminase (SGPT) in large mammals following various types and doses of radiation. The principal subjects were mature sheep although beagle dogs and 'miniature' swine were also used. The radiation sources were a cobalt-60 teletherapy unit, a 250-kvp X-ray therapy unit, and a Godiva II pulsed fission-spectrum neutron reactor. Results indicate that the quantity and type of irradiation received by these animals cannot be determined from these parameters. (Author)

AD-627 877 Fld. 6/18
DEFENCE CHEMICAL BIOLOGICAL AND RADIATION LABS OTTAWA (ONTARIO)
THE EFFECT OF DAMAGE ON CELL CONDUCTIVITY IN ELECTRONIC CELL SIZE DISTRIBUTION.
Technical note,
by P. V. Vittorio. 7 May 65, 4p. Rept. no. DCBRL-TN-65-7

Unclassified report

Availability: Published in Canadian Journal of Physiology and Pharmacology v43 p1027-9 1965. Copies to DDC users only.

Descriptors: (*Radiation effects, Lymphocytes), (*Lymphocytes, Counting methods), (*Cell structure, Radiation effects), Blood counts, Electronic equipment, X rays, Bone marrow, Membranes (Biology), Radiological dosage, Rats, In vitro analysis

Using a Coulter counter, the study was carried out to determine whether cell membrane injury from irradiation or by mechanical means changed cell conductivity to such an extent that false cell size distribution curve would result.

AD-627 303 **See Fld. 18/8**

AD-627 332 **See Fld. 6/6**

6/19. STRESS PHYSIOLOGY

AD-627 325 Fld. 6/19
CFSTI Prices: HC $3.00 MF $0.75
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS
VISUAL RECOVERY FROM HIGH INTENSITY FLASHES.
Interim rept. no. 1, 15 May 64-15 May 65,
by Norma D. Miller. Jul 65, 90p. Contract AF 41 (609)-2426 Proj. AF-6301 Task 630103
Unclassified report

Descriptors: (*Flashblindness, Recovery), (*Afterimages, Brightness), Eye, Retina, Safety devices, Eyeglasses, Windshields, Time, Intensity, Luminescence, Light, Vision, Adaptation (Physiology), Tables, Graphics, Aviation medicine

High intensity flashes of 0.04 msec to 1.4 msec duration were used to determine the afterimage brightness as a function of time following the flash. Six human subjects made continuous matches of the afterimage for periods up to six minutes following the flashes. The flash energies ranged from 3 x 10 to the minus 7th power to 800,000 td.sec or from 0.012 to 0.0003 cal/cm sq. at the retina, neglecting losses in the ocular media. The mean afterimage brightness, 5 sec following the highest intensity flashes, was 100,000 td. The afterimage brightness data were correlated with recovery time measurements for Sloan -Snellen letters presented at luminance levels from 280 mL to 0.07 mL. The reciprocity relationship between the duration and luminance of flashes subtending 7.5 degrees visual angle was investigated for constant flash energy of 3 x 10 to the minus 7th power td.sec. Seven flash durations from 0.5 to 5.0 msec were tested. The recovery times for the Sloan-Snellen letters at various luminance levels increased approximately 30% following 1.5 msec flashes compared with the 0.5 msec flashes. There was no apparent change for the mean recovery times for four subjects following flashes from 1.5 msec in duration. (Author)

AD-627 420 Fld. 6/19
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
EFFECTS OF LOW FREQUENCY AND INFRASONIC NOISE ON MAN.
Final rept. Nov 63-Feb 65,
by George C. Mohr, John N. Cole, Elizabeth Guidand , and Henning E. von Gierke. Sep 65, 12p.
Rept. no. AMRL-TR-65-69
Proj. AF-7231 Task 723103
Unclassified report

Availability: Published in Aerospace Medicine v36 n9 p817-24 Sep 1965. Copies to DDC users only.

Descriptors: (*Extremely low frequency, Noise), (*Noise, Tolerances (Physiology), Stress (Physiology), Audiofrequency, Manned spacecraft, Launching, Simulation, Heart, Hearing, Visual acuity, Motor reactions, Space perception, Speech Intelligibility, Performance (Human), Space medicine

Future manned space systems, with larger payloads and more powerful boosters, will generate during launch operations noise environments with maximum energy in the 1 - 100 cps frequency range. In order to investigate human tolerance to such environments, five noiseexperienced officers were exposed for two-minute periods to high intensity broad-band, narrow-band, and pure-tone low frequency noise. The effects of these exposures on cardiac rhythm, hearing threshold, visual acuity, fine motor control, spatial orientation, speech intelligibility, and subjective tolerance were observed. Exposures up to 154 dB in the 1 - 100 cps range were achieved; the range of human exposure to infrasound was extended from 20 to 40 dB above prior documented experience. Both objective and subjective responses of the subjects demonstrated that short-duration exposure to low frequency noise up to 150 dB is well within human tolerance limits. Exposures above 150 dB elicited responses indicating the limiting range of subjective tolerance and reliable performance was being approached. (Author)

AD-627 804 Fld. 6/19
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
'H-RESPONSE' IN THE ELECTROENCEPHALOGRAMS OF AIRCREW PERSONNEL,
by Edward A. Liske. 1964, 8p. Rept. no. SAM-TR-65-229
Proj. AF-7755
Unclassified report

Availability: Published in Aerospace Medicine, v36 n9 p884-7 Sep 1965. Copies to DDC users only.

Descriptors: (*Electroencephalography, Aviation personnel), (*Aviation personnel, Electroencephalography), Head, Pain, Medical examination, Diagnosis, Aviation medicine

Most clinical reports on the subject agree that the EEG in migraine patients reveal dysrhythmic trends to a greater degree than in normal controls; however, the EEG findings have little specificity. Recently frequency analysis of the EEGs of migraine patients has revealed a much stronger photic response at the higher stimulation rates. When this response is graphed a curve emphasizing the high-frequency response is obtained. This curve has been called the H-response. The present study explores the possibility of determining an 'Hresponse' by simple visual assessment of the EEG without the inconvenience and expense of using a frequency analyzer. The 12 'H-responses' that were obtained from 553 patients are correlated with the clinical findings, with special attention to those with migraine. It is concluded that those 'H-responses' which are determined by visual methods cannot be correlated with migraine. (Author)

AD-627 853 Fld. 6/19
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
INFLUENCE OF ROTATION TRAINING ON MOTOR CONDITIONED REFLEXES IN RATS,
by S. I. Nudman. 5 Nov 65, 16p. Rept. no. FTD-TT-65-969
TT 66-60482

Unedited rough draft trans. of Zhurnal Vysshei Nervnoi Deyatelnosti (USSR) v14 n5 p885-91 1964.

Descriptors: (*Conditioned reflex, Rotation), (*Rotation, Training), Stress (Physiology), Rats, Acceleration tolerance, Motor reactions, USSR

AD-627 906 Fld. 6/19
CFSTI Prices: HC $2.00 MF $0.50
NAVY EXPERIMENTAL DIVING UNIT WASHINGTON D C
CALCULATION OF AIR SATURATION DECOMPRESSION TABLES.
Research rept.,
by R. D. Workman. 20 Jun 57, 48p. Rept. no. RR-11-57
Proj. NS185-005
Unclassified report

Descriptors: (*Decompression, Tables), (*Diving, Decompression), Compressed air, Tissues (Biology)

A decompression table was developed to provide safe, efficient decompression from exposures of 40 feet for 720 minutes to 300 feet for 180 minutes at suitable increments of depth. On the basis of the results of 46 long exposure dives it was determined that control of such slower half-time tissues as the 160 and 240 minute tissues was required to provide reasonably safe decompression. The control of the allowable tissue tensions at the decompression stops was determined on the basis of the relation of change (S) and differential (E) to known safe tissue tensions at 66 feet and 33 feet absolute for the various half-time tissues. Decompression time required for long exposures calculated on these controls is much greater than provided by the present Air Saturation Table. The tables presented provide safe decompression for all but subjects more susceptible than usual to decompression sickness from long exposures. (Author)

AD-627 907 Fld. 6/19
CFSTI Prices: HC $2.00 MF $0.50
NAVY EXPERIMENTAL DIVING UNIT WASHINGTON D C
THE EFFECT OF EXERCISE DURING DECOMPRESSION FROM INCREASED BAROMETRIC PRESSURES ON THE INCIDENCE OF DECOMPRESSION SICKNESS IN MAN,
Rept. no. 1,
by O. E. Van Der Aur, R. J. Kellar, and E. S. Brinton. Mar 49, 45p. Rept. no. 8-49
Unclassified report

Descriptors: (*Decompression sickness, Exercise), (*Exercise, Decompression sickness), Diving, Barometric pressure, Decompression, Humans, Pain, Relaxation (Physiology), Stress (Physiology)

Twenty-seven divers in excellent physical condition were used as subjects for the studies. A total of 201 dives were made, 60 being of the saturation type (depths of 33 to 40 feet for 12 hours exposure) and 141 of them being of the short deep variety. Results: the adverse effect of exercise is similar after saturation dives or the deep dives. For the saturation dives the incidence of pain among 14 subjects who rested was 35.7T as compared to 71.4% when the same subjects exercised. For all deep dives, the incidence of pain was 16.36% among 55 subjects who rested as compared to 49.09% when the same subjects exercised. A summary of all singular dives, although not as significant for true comparison, reveals a similar increase of pain symptoms when exercise was performed. Recommendations: the performance of exercise by divers during their decompression period or immediately after reaching surface pressure is not recommended and its employment in current diving practice should be discontinued.

AD-628 041 Fld. 6/19, 5/10, 6/16
CFSTI Prices: HC $2.00 MF $0.50
DEFENCE RESEARCH MEDICAL LABS TORONTO (ONTARIO)
ANNUAL REPORT OF THE DEFENCE RESEARCH MEDICAL LABORATORIES, 1964.
1964, 48p.
Unclassified report

Descriptors: (*Stress (Physiology), Medical research), (*Performance (Human), Medical research), Human engineering, Reports, Canada, Sensory perception, Climatology, Adaptation (Physiology), Physics, Statistical analysis, Physiology, Medical laboratories

Research is summarized in the following fields: human factors, physiology, physics and biostatistics.

AD-627 341 See Fld. 6/20

AD-627 686 See Fld. 22/1

AD-627 928 See Fld. 6/13

6/20. TOXICOLOGY

AD-627 307 Fld. 6/20, 6/5
CFSTI Prices: HC $1.00 MF $0.50
ARMY MEDICAL RESEARCH LAB FORT KNOX KY
DETOXIFICATION OF VENOMS OF AGKISTRODON PISCIVORUS AND CROTALUS ATROX WITH LACTIC ACID,
by Gilberto S. Trevino. 1 Oct 65, 20p. Rept. no. USAMRL-643
Proj. DA-3A014501B71P Task 3A014501B71P10
Unclassified report

Descriptors: (*Venoms, Antigens + antibodies), (*Detoxification, Venoms), Reptiles, Neutralization, Lactic acid, Chemotherapeutic agents, pH, In vivo analysis, Antigen-antibody reactions, Resistance (Biological), Tetracyclines, Dogs, Rabbits

Antigens derived from the crude venom of Agkistrodon piscivorus and Crotalus atrox were prepared by the use of 0.5% lactic acid, pH 2.4. When injected into three dogs and two rabbits, a marked resistance to the venoms was indicated by serum neutralization and agar-gel diffusion tests. (Author)

AD-627 341 Fld. 6/20, 6/19
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
OXYGEN TOXICITY: ULTRASTRUCTURAL AND METABOLIC ASPECTS.
Final rept. Aug 63-Jun 65,
by Philip Felig. 1965, 9p. Rept. no. AMRL-TR-65-122
Contract AF 33 (615)-1849 ,NASA-R-87 Proj. AF-7164 Task 716404
lassified report

Availability: Published in Aerospace Medicine, v36 n7 p658-62 Jul 1965. Copies to DDC users only.

Descriptors: (*Oxygen, Toxicity), Cells (Biology), Metabolism, Nucleotides, Rats, Pathology, Cell structures, Mitochondria, Space medicine, Lungs

Evidence is reviewed indicating that exposure of rats to oxygen at 760 mm. Hg and at 258 mm. Hg results in subcellular hepatic and renal alterations, in the absence of pulmonary histopathology. Mitochondrial changes including enlargement, clumping and increased numbers of cytolosomes containing degenerating membranes constitute the striking findings. Thyroid overactivity is excluded as the basis for these changes inasmuch as protein-bound iodine is reduced (at 760mm. Hg) or remains the same (at 259 mm. Hg). The possibility that alterations in the redox state of pyridine nucleotides may be the responsible toxic cellular mechanism is suggested by the protective action of sodium lactate and by in vitro studies on agents inducing mitochondrial swelling. (Author)

AD-627 368 Fld. 6/20, 6/1
CFSTI Prices: HC $1.00 MF $0.50
ARMY MEDICAL, RESEARCH LAB FORT KNOX KY
THE EFFECT OF PH, TEMPERATURE, ANTIVENIN AND FUNCTIONAL GROUP INHIBITORS ON THE TOXICITY AND ENZYMATIC ACTIVITIES OF CROTALUS ATROX VENOM,
by John H. Brown. 20 Sep 65, 22p. Rept. no. USAMRL-640
Proj. DA-3A014501B71P Task 3A014501B71P11
Unclassified report

Descriptors: (*Venoms, Toxicity), (*Detoxification, Venoms), pH, Temperature, Enzymes, Toxins + antitoxins, Reptiles, Bromine compounds, Succinimides, In vivo analysis, Mice

Venom of Crotalus atrox can be detoxified with N-bromosuccinimide. The toxin (s) are not affected by treatment at low pH but are inactivated by heating at 75 or 100C. At these temperatures all of the enzymes tested are inactivated except phospholipase A. (Author)

AD-627 529 Fld. 6/20
CFSTI Prices: HC $1.00 MF $0.50
CHEMICAL RESEARCH AND DEVELOPMENT LABS EDGEWOOD ARSENAL MD
ISOLATION AND IDENTIFICATION OF THE TOXIC FRACTIONS OF COBRA VENOM.
Rept. for Sep 64-Aug 65,
by James A. Vick, Henry P. Ciuchta, James H. Manthei, Clarence Broomfield, and Byron Currie.
Dec 65, 17p. Rept. no. CRDLR-3345
Task 1C522301A07901
Unclassified report

Descriptors: (*Venoms, Toxins + antitoxins), Reptiles, Toxicity, Dogs, Electroencephalography, Respiratory system, Paralysis, Neuromuscular transmission, Cardiovascular system, Hypotension, Identification, Parenteral infusions, Barbiturates, Chromatographic analysis

The venom of the cobra (Naja naja) produces a variety of physiological changes when administered to experimental animals. Observations lead to the speculation that cobra venom contains more than one toxic fraction. Results of this study show that cobra venom is composed of three physiologically identifiable components. The first component produces a complete loss of cortical electrical activity upon intravenous administration into the dog. The second component causes respiratory paralysis either by nerve blockade at the neuromuscular junction of the diaphragm or by nerve membrane depolarization. The third component affects the cardiovascular system, ultimately causing irreversible hypotension. The mechanism of this action is still unknown. (Author)

AD-627 873 Fld. 6/20, 15/2, 7/3
DEFENCE CHEMICAL BIOLOGICAL AND RADIATION LABS OTTAWA (ONTARIO)
PREPARATION OF ANTIDOTES FOR ANTICHOLINESTERASE POISONING, III. ESTERS OF 1-ARYLCYCLOALKANE-CARBOXYLIC ACIDS,
by J. H. Parkkari, R. A. B. Bannard, and I. W. Coleman. 16 Jun 65, 11p. Rept. no. DCBRL-470
Unclassified report

Availability: Published in Canadian Journal of Chemistry v43 p3119-28 1965. Copies to DDC users only.

Descriptors: (*Anticholinesterase inhibitors, Esters), (*Esters, Anticholinesterase inhibitors), Cycloalkanes, Aromatic compounds, Carboxylic acids, Synthesis (Chemistry), Effectiveness, Poisoning, Sarin, Atropine, Canada

The synthesis of fifteen analogs of Parpanit and for N-methyl-4'-piperidyl 1-arylcycloalkane carboxylate hydrochlorides is reported. The compounds were required for evaluation of their efficacy as substitutes for, or adjuncts to, atropine in the treatment of sarin poisoning.

AD-627 996 Fld. 6/20, 6/15, 6/5
CFSTI Prices: HC $1.00 MF $0.50
CHEMICAL RESEARCH AND DEVELOPMENT LABS EDGEWOOD ARSENAL MD
BOTULINUM ANTITOXIN AS A THERAPEUTIC AGENT IN MONKEYS WITH EXPERIMENTAL BOTULISM.
Technical rept., Jan 63-Aug 64,
by Fred W. Oberst, Paul Cresthull, James W. Crookand , and Michael J. House. Oct 65, 16p. Rept. no. CRDLR-3331
Proj. DA-1C622401A097
Unclassified report

Descriptors: (*Food poisoning, Therapy), (*Clostridium botulinum, Toxins + antitoxins), (*Toxins + antitoxins, Clostridium botulinum), Monkeys, Diseases, Vaccines

Antitoxin administered soon after the appearance of the first toxic signs in monkeys given 2.5 to 5.0 LD50's of botulinum toxin resulted in complete recovery in 11 out of 15 animals when liquid food and fluids were forced during the period of aphagia. When no supportive treatment was applied, only one out of six survived. The survivor had received 2.5 LD50's of toxin. It is concluded that most monkeys given 2.5 to 5.0 LD50s of botulinum toxin intravenously can be saved when the antitoxin is administered soon after the first toxic signs are detected and when daily, supplemental, intragastric feedings, vitamins and antibiotics are given. (Author)

AD-627 548 See Fld. 6/16

6/21. WEAPON EFFECTS

AD-627 291 See Fld. 15/6

Field 7-CHEMISTRY

7/2. INORGANIC CHEMISTRY

AD-627 391 Fld. 7/2, 7/4
CFSTI Prices: HC $2.00 MF $0.50
ILLINOIS UNIV URBANA DEPT OF CHEMISTRY AND CHEMICAL ENGINEERING
PARAMAGNETIC RESONANCE STUDIES OF BONDING IN CRC15 (H2O)2 (-).
Technical rept.,
by Barry B. Garrett, Keith DeArmond, and H. S. Gutowsky. 24 Dec 65, 26p. Rept. no. TR-87
Contract Nonr-1834 (13) Proj. NR-051-215
Unclassified report

Descriptors: (*Chromium compounds, Chemical bonds), (*Paramagnetic resonance, Chromium compounds), (*Complex compounds, Chemical bonds), Chlorides, Electron spin resonance, Hydrates, Hamiltonian, Operators (Mathematics), Molecular orbitals, Molecular energy levels, Integrals

Single crystal, room temperature electron spin resonance spectra are reported for the complex ion CrC15 (H2O)2 (-) in the host lattice (NH4)2 InC15 (H2O). The spectra are analyzed by means of a rhombic spin-Hamiltonian and the spin-Hamiltonian parameters are related to an LCAO-MO description of the ligand-Cr3+ bonding. The complexity of the d3 system and the lack of sufficient experimental parameters prevented the direct evaluation of molecular orbital mixing coefficients from the ESR and optical data as was accomplished previously for tetragonal d1 complexes. However, an independent estimate of the spin-orbit coupling is used to establish interrelationships among the four molecular orbital mixing coefficients of interest and serves as a basis for discussing the bonding in CrC15 (H2O)2 (-). Evidence is found for pi bonding to the H2O. Also, as in the case of the d1 complexes, charge transfer states are found to contribute significantly to g and to the zero-field splitting parameter D. The sign of their contribution to D is controlled by the mixing coefficients and can be either positive or negative; the contribution of doublet states appears to be small.

AD-627 438 Fld. 7/2
CFSTI Prices: HC $2.00 MF $0.50
UNITED STATES INDUSTRIAL CHEMICALS CO CINCINNATI OHIO
STUDIES ON EXCITATION PARAMETERS.
Summary technical rept. no. 1, 1 Nov 64-31 Oct 65,
by Roger D. Laib, James D. Lykins, and L. DonaldHinshaw. Nov 65, 50p. Contract AF33 (615)-2193 Proj. AF-7360 Task 736005
AFML TR-65-362

Unclassified report

Descriptors: (*Excitation, Spectroscopy), (*Niobium, Impurities), (*Molybdenum, Impurities), Oxides, Distillation, Sensitivity, Quantitative analysis, Graphite, Temperature, Spectra (Visible + ultraviolet), Line spectrum, Electrode holders, Silver compounds, Chlorides, Fluorides, Copper compounds

The work described is concerned with the effect that excitation parameters have on the sensitivity and reproducibility of emission spectrochemical techniques for the analysis of trace elements in niobium and molybdenum. The parameters chosen include current, atmosphere composition, pressure, vacuum, electrode shape, and electrode material. A mixture of silver chloride and silver fluoride in a 1:1 ratio was found to be the most effective carrier for a niobium matrix and a combination of silver chloride, silver fluoride, copper oxide, and graphite was for a molybdenum matrix. Impurities in niobium oxide are evolved in 90 seconds by a carrier distillation method. Temperature studies indicate that a pyrolytic graphite barrier does increase the temperature of the electrode cup, but the improvement in carrier distillation is not apparent. The atmosphere chamber was used for moving plate studies at reduced pressures in an argon atmosphere. For niobium oxide, as the pressure is reduced the elements are more efficiently distilled from the electrode cup.

AD-627 666 Fld. 7/2, 7/3, 7/4, 7/5
CFSTI Prices: HC $6.00 MF $1.25
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH WASHINGTON D C
DIRECTORATE OF CHEMICAL SCIENCES PROGRAM REVIEW (11TH) FOR FISCAL YEAR 1965,
by Anthony J. Matuszko, and Milton D. Sprinkel. Nov 65, 257p. Rept. no. AFOSR-65-1559

Unclassified report

Descriptors: (*Chemistry, Air Force research), (*Chemical reactions, Reviews), (*Laboratory equipment, Reviews), (*Phase studies, Reviews), (*Molecular properties, Reviews), (*Materials, Reviews), Atmosphere, Sound, Photochemistry, Lasers, Spectroscopy, Inorganic compounds, Polymers, Symposia

The purpose of the review is to provide a unified record of research in progress together with the achievements resulting from the AFOSR program of supported basic research in chemistry. There are three main sections in the Review. For each project which was completed during fiscal year 1965, a concise factual summary (including administrative data as well as research accomplishments) is provided. Another section contains geographic and other program statistics, a list of all scientific reports received during the year, and a list of the active projects. A third section is devoted to research high-lights, items of special interest described in terms understandable by the non-specialist.

AD-627 787 Fld. 7/2, 21/9.1
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
SYNTHESIS OF NITROGEN FLUORIDES IN A NITROGEN PLASMA JET,
by B. R. Bronfin, and R. N. Hazlett. 12 Jan 66, 16p. Rept. no. NRL-6340
Proj. RR-010-01-44-5851

Unclassified report

Descriptors: (*Nitrogen compounds, Fluorides), (*Fluorides, Synthesis (Chemistry)), (*Plasma jets, Nitrogen), (*Liquid rocket oxidizers, Synthesis (Chemistry)), Electric arcs, Halogenated hydrocarbons, Sulfur compounds, Fluoramines, Cyanogen

Nitrogen-fluorine compounds have a high energy content, which makes them of interest in the propellant field. An electric arc technique, which has been used in the synthesis of other high-energy compounds, has now been applied to the nitrogen-fluorine system. A nitrogen plasma jet was intermixed with gaseous fluorides (CF4 or SF6) and subsequently quenched. Small yields of NF3, N2F4, and CF3NF2 were produced, together with trace quantities of other products. The observed products were accounted for by a reaction sequence involving the formation of FCN and its subsequent stepwise fluorination by addition at the triple bond. FCN is only an intermediate, however, and had not been found in the product stream. The yield of fixed-nitrogen products is about 1% of inlet nitrogen for typical conditions, and it increases with increasing power input and increasing F/N ratio in the plasma. (Author)

AD-627 812 Fld. 7/2
CFSTI Prices: HC $2.00 MF $0.50
MILAN UNIV (ITALY) ISTITUTO DI CHIMICA GENERALE
COMPLEX HYDRIDES AND ZEROVALENT DERIVATIVES OF TRANSITION METALS.
Final rept.,
by Lamberto Malatesta. 1 Nov 65, 49p. Contract AF-EOAR-9-64 Proj. AF-9710 Task 971002
AFOSR 65-2717

Unclassified report

Descriptors: (*Transition elements, Complex compounds), (*Complex compounds, Hydrides), (*Hydrides, Complex compounds), Platinum compounds, Rhenium compounds, Phosphines, Gold compounds, Iridium compounds, Rhodium compounds, Cobalt compounds, Synthesis (Chemistry), Chemical properties, Italy

The following papers are included in whole or in summary: Hydridocomplexes of transition metals (description of compounds of the type MeH (DPE)2 (Me = Co, Rh; DPE = C2H2 /P (C6H5)3/ 2 and of /CoH2 (DPE)2/ClO4); Basic behaviour of platinum (O) derivatives (the reaction PtL3 + HCl = /PtHL3/Cl and PtHL3/Cl = PtHL2Cl+L/ L = (C6H5)3P/ are described and discussed); Tricarbonyl-and hydridotricarbonyl-bistriphenylphosphinerhenium (the reaction ReH5L3 + CO = ReH(CO)3L2 + 2H1;l/l - p9c6H5)3/ and ReH (CO)3L2 +2H2;l/l - p9c6H5)3/ and ReH (CO)3L2 to Re (CO)3L2 (monomeric paramagnetic) are described); Novel rhenium triphenylphosphine compounds (description of the preparation and properties of the new hydrides ReH5L2 and ReH5L3/L = P (C6H5)3/); Triphenylphosphine gold (O) gold (I) compounds (the preparation and properties of the compounds /Au5L4/ X /L = P (C6H5)3, X = Cl, NO3, ClO4, B (C6H5)4, SnCl3/ and Au3L2 X /X = I, CN, SnI3/ are described and discussed); New triphenylphosphine iridium compounds (description of an insaturated hydride IrH3L2 /L = P (C6H5)3/, of the carbonylhydrides IrH3 (CO)L2 and IrH (CO)L2, of a cationic carbonylderivative /Ir (CO)3L2/ClO4 and of a metalorganic compound Ir (CO2Me) (CO)2L2.

AD-627 831 Fld. 7/2, 7/4
TEXAS TECHNOLOGICAL COLL LUBBOCK DEPT OF CHEMISTRY
THE THERMAL DECOMPOSITION OF METAL COMPLEXES. XVI. POTASSIUM TRIS (OXALATO) COBALTATE (III) TRIHYDRATE.
Revised ed.,
by W. W. Wendlandt, and E. L. Simmons. 7 May 65, 10p. Contract AF-AFOSR-23-63 Proj. AF-9762 Task 976203
AFOSR 65-2762

Unclassified report

Revision of manuscript received 27 Jan 65. See also AD-612 245.

Availability: Published in Journal of Inorganic and Nuclear Chemistry v27 p2317-23 1965. Copies to DDC users only.

Descriptors: (*Complex compounds, Pyrolysis), (*Potassium compounds, Pyrolysis), (*Cobalt compounds, Pyrolysis), (*Oxalates, Pyrolysis), Decomposition, Hydrates, Thermogravimetric analysis, Spectroscopy, Differential thermal analysis, Mass spectroscopy, Gas analysis, Magnetic properties, Ultraviolet radiation

The thermal decomposition of K3/Co (C2O4)3/ .3H2O in the solid-state, was studied by thermogravimetry, high temperature reflectance spectroscopy, differential thermal analysis, mass spectrometry, gas evolution analysis, and by magnetic techniques. The stoichiometry of the decomposition reaction was determined and a mechanism is proposed to explain the reaction. The ultraviolet photolysis of the compound, in the solid-state, was also determined. The photolysis and thermal decomposition reactions did not involve exactly the same products. (Author)

AD-627 832 Fld. 7/2, 7/4, 7/5
TEXAS TECHNOLOGICAL COLL LUBBOCK DEPT OF CHEMISTRY
THE THERMAL DECOMPOSITION OF METAL COMPLEXES. XVII. POTASSIUM TRIS (OXALATO) MANGANATE (III) TRIHYDRATE.
Revised ed.,
by E. L. Simmons, and W. W. Wendlandt. 7 May 65, 8p. Contract AF-AFOSR-23-63 Proj. AF-9762 Task 976203
AFOSR 65-2763

Unclassified report

Revision of manuscript submitted 17 Mar 65.

Availability: Published in Journal of Inorganic and Nuclear Chemistry v27 p2325-9 1965. Copies to DDC users only.

Descriptors: (*Complex compounds, Pyrolysis), (*Potassium compounds, Pyrolysis), (*Oxalates, Pyrolysis), (*Manganates, Pyrolysis), Hydrates, Decomposition, Photolysis, Ultraviolet radiation, Reaction kinetics, Spectroscopy, Mangetic properties, Differential thermal analysis, Gas analysis

The photochemical and thermal dissociation of K3/Mn (C2O4)3/.3H2O was determined. On exposure to ultraviolet radiation or heating to 85C, the compound yields K2/Mn (C2O4)2/, K2C2O4, CO2, and H2O. The kinetics of the photolysis reaction was determined with k = 52.7/min at 25C. The above reactions are compared with the analogous reactions of K3/Co (C2O4)3/.3H2O, described AD-627 831. (Author)

AD-627 836 Fld. 7/2, 7/4
NORTH CAROLINA UNIV CHAPEL HILL DEPT OF CHEMISTRY
THIN LAYER POTENTIAL SCAN COULOMETRY, DETERMINATION OF METAL IONS AND OF HALIDE IONS USING A MERCURY COATED PLATINUM ELECTRODE,
by Donald M. Oglesby, Larry B. Anderson, Bruce McDuffie, and Charles N. Reilley. 8 Feb 65, 7p. Contract AF-AFOSR-584-64
AFOSR 65-2766

Unclassified report

Availability: Published in Analytical Chemistry v37 n11 p1317-21 Oct 1965. Copies to DDC users only.

Descriptors: (*Volumetric analysis, Electrolysis), (*Metals, Volumetric analysis), (*Halides, Volumetric analysis), Electrochemistry, Electrodes, Mercury, Platinum, Copper compounds, Lead compounds, Cadium compounds, Zinc compounds Iodides, Bromides, Chlorides

A linear ramp potential excitation was applied to a thin layer electrolysis cell containing a solution of several electroactive substances. The integral of the current response constitutes a coulometric titration of the electroactive species present. The technique, potential scan coulometry, was evaluated by electrolysis of solutions of copper, lead, cadmium, and zinc ions in a 1M KNO3 medium and precipitation of I (-), Br (-), and Cl (-) ions with mercurous ion electrogenerated from a mercury-coated platinum electrode. The technique appears to be particularly suited to rapid analysis of mixtures and of very small amounts of electroactive substance. (Author)

AD-627 923 Fld. 7/2, 7/4
CFSTI Prices: HC $1.00 MF $0.50
VICTORIA UNIV WELLINGTON (NEW ZEALAND) DEPT OF CHEMISTRY
APPLICATIONS OF THE MOSSBAUER EFFECT IN CHEMISTRY.
Final rept.,
by J. F. Duncan. 1965, 6p. Contract AF-AFOSR-27-63
AFOSR 65-2530

Unclassified report

Descriptors: (*Mossbauer effect, Chemistry), Iron compounds, Complex compounds, Phosphates, Spinels, New Zealand

Developmental work on the application of the Mossbauer effect in theoretical and applied inorganic chemistry is summarized.

AD-627 936 Fld. 7/2
PURDUE UNIV LAFAYETTE IND DEPT OF CHEMISTRY
REMOTE LIGAND SUBSTITUENTS IN NICKEL (II) COMPLEXES AFFECTING THE RATE OF LOSS OF COORDINATED WATER,
by Dale W. Margerum, and R. K. Steinhaus. 19 Aug 65, 2p. Contract AF-AFOSR-134-65 Proj. AF-9710 Task 971001
AFOSR 65-2767

Unclassified report

Availability: Published in Journal of the American Chemical Society v87 p4643-4 1965. Copies to DDC users only.

Descriptors: (*Complex compounds, Substitution reactions), (*Nickel compound, Substitution reactions), N-heterocyclic compounds, Polycyclic compounds, Water, Reaction kinetics

Substituents on position 5 of the ligand in mono (1,10 -phenanthroline)nickel (II) complexes influence the rate of replacement of water molecules coordinated to the nickel. Reactions were studied with diethylenetriamine (dien) and with nitrilotriacetate (NTA) leading to the formation of mixed complexes without displacement of the 1,10-phenanthroline or 5-substituted 1,10-phenanthroline. (Author)

AD-627 938 Fld. 7/2, 20/12, 20/2
TEXAS UNIV AUSTIN DEPT OF CHEMICAL ENGINEERING
THE PHASE EQUILIBRIA AND CRYSTAL CHEMISTRY OF THE RARE EARTH-GROUP VI SYSTEMS. IV. LANTHANUM-TELLURIUM,
by T. H. Ramsey, H. Steinfink, and E. J. Weiss. 15 Mar 65, 6p. Contract AF-AFOSR-62-237 Proj. AF-9761 Task 976102
AFOSR 65-1925

Unclassified report

See also AD-622 647.

Availability: Published in Inorganic Chemistry v4 n8 p1154-7 Aug 1965. Copies to DDC usrs only.

Descriptors: (*Rare earth elements, Phase studies), (*Lanthanum alloys, Phase studies), (*Tellurium alloys, Phase studies), Crystal lattices, Crystal structure, Melting point, Solid solutions, X-ray diffraction analysis

The phases occurring in the lanthanum-tellurium system are LaTe, f.c.c., a = 6.436 A., m.p. 1720C; a solid solution series La3Te4-La2Te3 which has the Th3P4-type structure, the cubic lattice constant for the two end members are a = 9.628 and 9.619 A., respectively, and they melt at 1515 and 1485C; a solid solution series LaTe2.0-LaTe1.7, the tetragonal unit cell for LaT2.0 has dimensions a = 4.506 A., c = 9.13 A. and melts incongruently at 1450C; and finally the phase LaTe3, orthorhombic, with a pseudo-tetragonal cell a = b = 4.41 A., c = 26.1 A., which melts incongruently at 835C. (Author)

AD-627 298 **See Fld. 7/4**

AD-627 299 **See Fld. 7/4**

AD-627 300 **See Fld. 5/1**

AD-627 301 **See Fld. 7/4**

AD-627 315 **See Fld. 7/4**

AD-627 406 **See Fld. 20/2**

AD-627 468 **See Fld. 20/2**

AD-627 502 **See Fld. 7/4**

AD-627 559 **See Fld. 7/4**

AD-627 656 **See Fld. 7/4**

AD-627 784 **See Fld. 7/4**

7/3. ORGANIC CHEMISTRY

AD-627 276 Fld. 7/3, 6/1
WALTER REED ARMY INST OF RESEARCH WASHINGTON D C DEPT OF IMMUNOCHEMISTRY
THE SYNTHESIS OF ETHYL P-NITROPHENYL ALPHA-ACETOXYALKYL PHOSPHONATES,
by L. S. Hafner, J. E. Brown, M. V. Garrison, and B. H. Alexander. 9 Apr 65, 2p.

Unclassified report

Availability: Published in Journal of Medicinal Chemistry v8 p730-1 Sep 1965. Copies to DDC users only.

Descriptors: (*Organic phosphorus compounds, Synthesis (Chemistry)), (*Enzyme inhibitors, Synthesis (Chemistry)), Organic nitrogen compounds, Ethers, Esters, Physical properties

A series of ethyl p-nitrophenyl alpha-acetoxyalkyl phosphonates were synthesized in order to ascertain their inhibitory action on various enzymes such as acetylcholine esterase, trypsin, and chymotrypsin. The synthetic routes to these compounds involve extensions to reactions previously reported. Physical constants of these compounds and intermediates used in their preparation are tabulated.

AD-627 494 Fld. 7/3
WASHINGTON UNIV ST LOUIS MO DEPT OF CHEMISTRY
ON ARYLBORON FREE RADICALS,
by S. I. Weissman, and Hans van Willigen. 15 Mar 65, 4p. Contract AF-AFOSR-771-65 Proj. AF-9767 Task 976701
AFOSR 65-2079

Unclassified report

Availability: Published in Journal of the American Chemical Society v87 p2285-6 1965. Copies to DDC users only.

Descriptors: (*Organoboranes, Free radicals), (*Free radicals, Organoboranes), Fluorides, Pyridines, Electron spin resonance, Aromatic compounds

Experiments were conducted on trimesitylboron, which are in disagreement with those of Leffler, Doland, and Tanigaki (Jour. Amer. Chem. Soc., v. 87: 928, 1965). Leffler, et al, concluded that dimesityboron fluoride over Na-K alloy gives the radical Mes B, that addition of pyridine to this radical gives a second radical, Mes2B to Pyr, and that the trimesitylboron negative ion, Mes3B, decomposes to Mes2B after prolonged reduction. It is now concluded that it is the dimesitylboron fluoride or its radical which decomposes and forms the trimesitylboron negative ion. Formation of Mes2B to Pyr is highly improbable. (Author)

AD-627 734 Fld. 7/3
OKLAHOMA STATE UNIV STILLWATER DEPT OF CHEMISTRY
GAS CHROMATOGRAPHIC ANALYSES OF ORGANOPHOSPHORUS COMPOUNDS USING A HYDROGEN FLAME IONIZATION DETECTOR. THE USE OF CHROMOSORB G AS A SOLID SUPPORT,
by K. Darrell Berlin, T. Howard Austin, M. Nagabhushanam, Melbert Peterson, and Jack Calvert. 22 Jun 65, 6p. Contract AF-AFOSR-132-65 Proj. AF-9762 Task 976202
AFOSR 65-2047

Unclassified report

Availability: Published in Journal of General Chemistry p256-9 Aug 1965. Copies to DDC users only.

Descriptors: (*Organic phosphorus compounds, Gas chromatography), (*Gas chromatography, Organic phosphorus compounds), Ionization, Hydrogen, Flames, Adsorption, Resolution

The analyses of several classes of organophosphorus compounds is described. Some of the problems usually associated with the chromatography of these compounds are evaluated and methods used to circumvent these difficulties are discussed. This report arose as a result of an attempt to analyze, both qualitatively and quantitatively, several different types of reaction mixtures containing phosphorus compounds. Results indicate that commercially available equipment (gas chromatograph and packed columns) is sufficient, without modification, to give good resolution and rapid analysis of a large variety of organophosphorus substances. (Author)

AD-627 774 Fld. 7/3
OREGON STATE UNIV CORVALLIS DEPT OF CHEMISTRY
SYNTHESIS OF OPTICALLY ACTIVE PHENYL BENZENETHIOL-SULFINATE BY ASYMMETRIC OXIDATION OF PHENYL DISULFIDE,
by John L. Kice, and George B. Large. 8 Aug 65, 8p. Contract AF-AFOSR-106-65
AFOSR 65-2045

Unclassified report

Availability: Published in Tetrahedron Letters n40 p3537-41 1965. Copies to DDC users only.

Descriptors: (*Organic sulfur compounds, Synthesis (Chemistry)), (*Thiosulfates, Molecular rotation), (*Stereochemistry, Thiosulfates), Aromatic compounds, Thiols, Sulfides, Oxidation, Polarographic analysis

It was found that oxidation of an aromatic disulfide with d-percamphoric acid represents a simple, convenient method for the preparation of an optically active aromatic thiolsulfinate having a sufficient

degree of optical activity for subsequent polarimetric rate measurements. This is the first reported example of an optically active thiolsulfinate in which the sulfinyl group is the sole source of asymetry in the molecule.

AD-627 816 Fld. 7/3, 7/4
CFSTI Prices: HC $1.00 MF $0.50
EDWARD DAVIES CHEMICAL LAB UNIV COLL OF WALES ABERYSTWYTH
REACTIONS OF FREE RADICALS CONTAINING NITROGEN.
Final rept.,
by A. F. Trotman-Dickenson. 26 Oct 65, 11p.
Contract AF-EOAR-23-63
AFOSR 65-2886

Unclassified report

Descriptors: (*Nitrogen compounds, Free radicals), (*Free radicals, Chemical reactions), (*Organic nitrogen compounds, Thermochemistry), Hydrizine derivatives, Amines, Nitriles, Pyrolysis, Heat of formation, Chemical bonds, Fluoramines, Alkenes, Aromatic compounds, Reaction kinetics, Photolysis, Great Britain

Hydrazines, Anilines and Cyanides were pyrolysed and the heats of formation of the resultant radicals and the strengths of the bonds formed by them deduced. The reactions of methyl and ethyl radicals with a variety of amino compounds were studied. The reactions of difluoroamino radicals in the addition to olefins and aromatic compounds and in the transfer of hydrogen and halogen atoms were investigated. (Author)

AD-627 826 Fld. 7/3, 14/2
NORTH CAROLINA UNIV CHAPEL HILL DEPT OF CHEMISTRY
POLAROGRAPHIC DROP-TIME MEASUREMENT USING AN ALTERNATING CURRENT TECHNIQUE,
by John W. Hayes, Donald E. Leyden, and Charles N. Reilley. 1965, 4p. Contract AF-AFOSR-584-64
AFOSR 65-2764

Unclassified report

Availability: Published in Analytical Chemistry v37 n11 p1444-5 Oct 1965. Copies to DDC users only.

Descriptors: (*Polarographic analysis, Test methods), (*Laboratory equipment, Polarographic analysis), Mercury, Electrodes, Instrumentation, Alternating current

The report describes a simple way to trigger an electronic counter to measure the drop time of a dropping mercury electrode using conventional operational-amplifier techniques. The signal from the current amplifier in a conventional operational-amplifier a.c. polarograph is filtered to remove the d.c. polarographic current, rectified, and applied to the counter input. The current is of sufficient magnitude over the whole potential range of the D.M.E., even in the absence of depolarizer, to provide sufficient voltage for positive triggering of the counter. Because the counter receives a pulse each time the drop falls, the drop time of every other drop is registered.

AD-627 828 Fld. 7/3
GEORGIA UNIV ATHENS DEPT OF CHEMISTRY
THERMAL DECOMPOSITION OF BETA-ALLYLOXYPROPIONYL PEROXIDE. CYCLIZATION OF THE BETA-ALLYLOXYETHYL RADICAL,
by Robert C. Lamb, James G. Pacifici, and Paul Wayne Ayers. 12 Apr 65, 6p. Contract AF-AFOSR-62-53 ,NSF-G24910 Proj. AF-9762 Task 976201
AFOSR 65-2760

Unclassified report

Availability: Published in Journal of Organic Chemistry v30 p3099-3102 Sep 1965. Copies to DDC users only.

Descriptors: (*Peroxides, Decomposition), (*Ethers, Chemical reactions), Pyrolysis, Reaction kinetics, Solvents, Toluenes, Xylenes, Monocyclic compounds, Furans

Results of kinetics runs are reported for decompositions of beta-allyloxypropionyl peroxide in toluene and p-xylene. The kinetics of decomposition in toluene are approximately first order, although very slight curvatures of first-order plots indicates a small amount of induced decomposition. Beta-Allyloxypropionyl peroxide decomposes somewhat more rapidly in p-xylene than in toluene, and the kinetic behavior is such as to suggest that there is more radical-induced decomposition in the former. Product studies are reported for decompositons of the beta-allyloxypropionyl peroxide in p-ylene and in the same solvent containing excess galvinoxyl. The main product formed from the beta-allyloxyethyl radical is 3-methyltetrahydrofuran, which indicates that this radical, like the 5-hexenyl radical, undergoes cyclization to give a five-memebered ring. (Author)

AD-627 829 Fld. 7/3, 7/4
GEORGIA UNIV ATHENS DEPT OF CHEMISTRY
KINETICS IN SOME SYSTEMS IN WHICH STABLE RADICALS FUNCTION AS SCAVENGERS OF REACTIVE RADICALS. THE DECOMPOSITION OF TRANS-GAMMA-BENZYLIDENE BUTYRL PEROXIDE IN BENZONITRILE CONTAINING ALPHA, GAMMA-BISDIPHENYLENE -BETA-PHENYLALLYL,
by Robert C. Lamb, James G. Pacifici, and Leonard P. Spadafino. 25 Mar 65, 7p. Contract AF-AFOSR-62-53
AFOSR 65-2761

Unclassified report

Availability: Published in Journal of Organic Chemistry v30 p3102-5 1965. Copies to DDC users only.

Descriptors: (*Free radicals, Reaction kinetics), (*Peroxides, Decomposition), Equations, Aromatic compounds, Solvents, Benzonitriles, Polycyclic compounds

Several kinetic equations which have potential use in radical scavenger experiments are presented and discussed. Experimental data for the decomposition of trans-gamma-benzylidene butyryl peroxide in benzonitrile containing excess alpha, gamma -bisdiphenylene-beta-phenylallyl are presented, and treated kinetically. This is an example of a system in which there is a slow decompositon of the scavenger alpha, gamma-bisdiphenylene-beta-phenylallyl in the solvent even in the absence of initiator. The slow decomposition is treated here as a pseudo-first-order process. (Author)

AD-627 830 Fld. 7/3
GEORGIA UNIV ATHENS DEPT OF CHEMISTRY
ORGANIC PEROXIDES. IV. KINETICS AND PRODUCTS OF DECOMPOSITIONS OF CYCLOHEXANEFORMYL AND ISOBUTYRYL PEROXIDES. BDPA AS A FREE-RADICAL SCAVENGER,
by Robert C. Lamb, James Grady Pacifici, and Paul Wayne Ayers. 17 Mar 65, 11p. Contract AF-AFOSR-62-53 ,NSF-G24910
AFOSR 65-2759

Unclassified report

Availability: Published in Journal of American Chemical Society v87 p3928-35 1965. Copies to DDC users only.

Descriptors: (*Peroxides, Decomposition), (*Free radicals, Chemical reactions), Pyrolysis, Cyclohexanes, Butanes, Aromatic compounds, Polycyclic compounds, Reaction kinetics, Solvents, Carbon tetrachloride, Thermochemistry, Volumetric analysis, Spectrum (Infrared)

The kinetics and free-radical efficiencies of the thermal decompositions of cyclohexaneformyl peroxide (I) and isobutyryl peroxide (II) in carbon tetrachloride were determined with excess alpha, gamma-bis (diphenylene)-beta-phenylallyl (BDPA) at temperatures between 30 and 85C. The rate constants and efficiencies obtained by the excess BDPA method are independent of the ratio of initial concentrations of BDPA to peroxide. Product studies were performed (by g.l.c. and infrared analysis) on mixtures obtained from the decompositions of I and II in carbon tetrachloride, and in the same solvent containing excess BDPA. Evidence is presented which indicates that inversion compounds (RCOOCOOR) are formed in the decompositions of both peroxides. Rate constants for decompositions of II in several other polar and nonpolar solvents at 40 were determined by idometric assay. Results suggest that the homolysis and the rearrangement of peroxide to inversion compound are two distince modes of decomposition.

AD-627 833 Fld. 7/3, 7/4
EDWARD DAVIES CHEMICAL LAB UNIV COLL OF WALES ABERYSTWYTH
PYROLYSES OF ETHLY CYANIDE, T-BUTYL CYANIDE, CUMYL CYANIDE, AND ACETAMIDE, AND BOND STRENGTHS IN CYANIDES
by Margaret Hunt, J. A. Kerr, and A. F.Trotman-Dickenson. 16 Feb 65, 6p. Contract AF-EOAR-23-63
AFOSR 65-2497

Unclassified report

Availability: Published in Journal of the Chemical Society n933 p5074-80 Sep 1965. Copies to DDC users only.

Descriptors: (*Nitriles, Pyrolysis), (*Acetamides, Pyrolysis), (*Chemical bonds, Nitriles), Thermochemistry, Decomposition, Methane, Ethylenes, Hydrogen, Dissociation, Heat of formation, Great Britain

Pyrolyses of several cyanides and acetamide were carried out by the aniline-carrier technique. Ethyl cyanide decomposes by three reactions yielding ultimately hydrogen, methane, and ethylene as gaseous products; the decomposition to give a methyl radical is a first-order homogeneous reaction with (686-765C): log k/ (sec.) = 14.1 - (72,700/2.3RT). The analogous reaction for t-butyl cyanide has (602-652C): log k/ (sec.) =15.2 - (70,200/2.3RT). The rate-determining step for the production of methane in the pyrolysis of cumyl cyanide is of the first-order and homogeneous with (520-624C): log k/ (sec.) = 12.3 - (54,100/2.3RT). The methane probably arises from bond rupture in the nitrile yielding a methyl radical, but it is possibly produced by direct molecular elimination. Acetamide decomposes mainly by the molecular elimination of ammonia for which the rate constant is (663-747C) log k/ (sec) = 14.7 (73,400/2.3RT). (Author)

AD-627 869 Fld. 7/3, 6/15
DEFENCE CHEMICAL BIOLOGICAL AND RADIATION LABS OTTAWA (ONTARIO)
3-MERCAPTOQUINUCLIDINE,
by K. B. Shaw. 24 Jun 65, 6p. Rept. no. DCBRL-455A

Unclassified report

Availability: Published in Canadian Journal of Chemistry, v43 p3112-5 1965. Copies to DDC users only.

Descriptors: (*Organic sulfur compounds, Synthesis (Chemistry)), (*N-heterocyclic compounds, Synthesis (Chemistry)), Thiols, Acetates, Hydrazones, Radioprotective agents

3,3-Dimercapto quinuclidine was obtained by bubbling hydrogen sulfide through an isopropanol solution of 3-quinuclidinone; the resultant product yielded 3-mercaptoquinuclidine upon treatment with sodium borohydride.

AD-627 874 Fld. 7/3
DEFENCE CHEMICAL BIOLOGICAL AND RADIATION LABS OTTAWA (ONTARIO)
NUCLEAR MAGNETIC RESONANCE AND INFRARED STUDIES OF ACYLATED IMIDAZOLIDINONES AND IMIDAZOLIDINETHIONES,
by R. Greenhalgh, and M. A. Weinberger. 2 Jul 65, 9p. Rept. no. DCBRL-472
Unclassified report

Presented at the C. I. C. Conference (46th), Edmonton, Jun 62.

Availability: Published in Canadian Journal of Chemistry v43 p3340-6 1965. Copies to DDC users only.

Descriptors: (*N-heterocyclic compounds, Molecular structure), (*Nuclear magnetic resonance, N-heterocyclic compounds), (*Infrared spectroscopy, N-heterocyclic compounds), Chemical reactions, Stereochemistry, Chemical bonds, Ketones, Organic sulfur compounds, Canada

The infrared and nuclear magnetic resonance spectra of 1-acyl and 1,3-diacyl derivatives of 2-imidazolidinones and 2-imidazolidinethiones were determined, where the acyl groups were acetyl, benzoyl, or trifluoroacetyl. The frequency of the ring carbonyl stretching vibration increases with the degree of acylation and the electronwithdrawing power of the acyl group. The methylene protons of the diacylated derivatives show a single peak, the paramagnetic shift of which is similarly dependent on these parameters when the ring current effects are allowed for. This correlation between the nu-C=O and tau-CH2 favors the conclusion that the anisotropy of the acyl carbonyl group does not affect the relative methylene proton shift in these compounds and hence they all have the same preferred configuration. This was deduced to be the planar trans,trans structure with respect to the carbonyls. In the unsymmetrical 1,3-diacyl derivatives. This, together with the changes in the nu-C=O (acyl), is explained by mesomeric equalization of the electronic environment of nitrogen atoms 1 and 3. The C=S bond is found to have a strong deshielding influence on all protons. (Author)

AD-627 875 Fld. 7/3, 7/4
FRANK J SEILER RESEARCH LAB AIR FORCE ACADEMY COLO
FLUORINE-19 MAGNETIC RESONANCE STUDY OF SECONDARY DEUTERIUM ISOTOPE EFFECTS OF THE METHYL GROUP,
by Daniel D. Traficante, and Gary E. Maciel. 4 Jun 65, 9p. Rept. no. SRL-65-0007
Proj. 7903 Task 7903-00
Unclassified report

Availability: Published in Journal of the American Chemical Society v87 n21 p4917-21 5 Nov 1965. Copies to DDC users only.

Descriptors: (*Fluorine compounds, Nuclear magnetic resonance), (*Toluenes, Nuclear magnetic resonance), (*Deuterated compounds, Nuclear magnetic resonance), (*Nuclear magnetic resonance, Fluorine), Halogenated hydrocarbons, Molecular isomerism, Reaction kinetics, Chemical equilibrium

The F19 chemical shifts of m- and p-fluorotoluene -alpha, alpha, alpha-d3 and their nondeuterated analogs were determined. No appreciable isotope effect was detected for the meta isomer; however, the chemical shift of p-fluorotoluene-alpha, alpha, alpha-d3 was found to be about 0.7 c.p.s. less than that of p-fluorotoluene. These results imply negligible or zero inductive isotope effects of the methyl group, but a small resonance isotope effect in the direction expected from recent results on secondary deuterium isotope effects in kinetic and equilibrium studies.

AD-627 937 Fld. 7/3
MASSACHUSETTS UNIV AMHERST DEPT OF CHEMISTRY
SIMPLIFIED PURIFICATION OF ACETONITRILE FOR ELECTROANALYTICAL APPLICATIONS,
by George A. Forcier, and John W. Olver. 1965, 2p. Contract AF-AFOSR-777-65
AFOSR 65-2385
Unclassified report

Availability: Published in Analytical Chemistry v37 n11 p1447-8 Oct 1965. Copies to DDC users only.

Descriptors: (*Acetonitriles, Purification), Electrochemistry, Polarographic analysis, Distillation, Organic soluents

Distillation of acetonitrile from sodium hydride following a short reflux period removes all traces of acrylonitrile as well as acidic impurities and water. If the sodium hydride treatment (basic) is followed by a reflux and distillation over an acid such as phosphorus pentoxide, sulfuric acid, etc., solvent suitable for acid-base work is obtained. Final distillation of the product from calcium hydride ensures dryness of the solvent. Solvent purified by this method contained no polarographically detectable traces of either unsaturated nitriles, or bases.

AD-627 953 Fld. 7/3
OKLAHOMA STATE UNIV STILLWATER DEPT OF CHEMISTRY
THE PYROLYSIS OF ALKYL DIPHENYLPHOSPHINATES,
by K. Darrell Berlin, and T. Howard Austin. 16 Feb 65, 7p. Contract AF-AFOSR-132-65 Proj. AF-9762 Task 976202
AFOSR 65-2048
Unclassified report

Availability: Published in Journal of Organic Chemistry v30 p2745-8 Aug 1965. Copies to DDC users only.

Descriptors: (*Organic phosphorus compounds, Pyrolysis), Phosphines, Esters, Decomposition, Alkenes, Molecular isomerism

Examination of the thermal decomposition of a series of alkyl esters of diphenylphosphinic acid indicates the pyrolysis occurs smoothly to give olefins in essentially quantitative conversions. A mechanism for the thermal transformation is postulated to involve a cyclic transition state. (Author)

AD-627 998 Fld. 7/3
CFSTI Prices: HC $2.00 MF $0.50
CHEMICAL RESEARCH AND DEVELOPMENT LABS EDGEWOOD ARSENAL MD
THE PREPARATION OF ALPHA,ALPHA-DISUBSTITUTED GLYCOLIC ACIDS.
Technical rept., Aug 63-Mar 65,
by Reuben Proper, and Friedrich W. Hoffmann. Oct 65, 33p. Rept. no. CRDLR-3318
Proj. DA-1C522301A060
Unclassified report

Descriptors: (*Carboxylic acids, Synthesis (Chemistry)), (*Aromatic compounds, Synthesis (Chemistry)), Ketones, Substitution reactions, Potassium compounds, Alkynes, Alcohols, Acetic acids, Amines

Several methods for the synthesis of glycolic acids of the type RR'C (OH)CO2H, in which R and R' are aryl, alkyl, or cycloalkyl groups (equal or different), were investigated to find a practicable route not requiring use of Grignard reagents. Benzilic acid, 9-fluorenol-9 -carboxylic acid, and potassium 4,4'-di- (dimethylamino) benzilate were obtained in yields of 82.5%, 93.4%, and 45.5%, respectively, by the carbonation in dioxane of benzophenone disodioketyl, fluorenone disodioketyl, and dipotassioketyl of 4,4'di- (dimethylamino)benzophenone (Michler's ketone). The conversion of 1,1 - di - (parachlorophenyl) - 1,2,2,2 - tetrachloroethane to 4,4'dichlorobenzil in a 98.5% yield was effected by the action of sulfuric acid at from 65 degrees to 75 degrees C. A : (% yield of 4,4'-dichlorobenzilic acid was obtained by the benzilic acid rearrangement of 4,4'-dichlorobenzil. Cyclopentylphenylglycolic acid in 30% yield resulted from oxidation of 1-cyclopentyl-1-phenyl-2-propyn-1-ol. This method is unsatisfactory, however, because of poor yield and hazards encountered in the preparation of the propynol from acetylene and ketone. With desired-product yield only 18%, the synthesis of a mixed acyloin (as a glycolic acid precursor) was unsatisfactory when aqueous potassium cyanide acted on an equimolar mixture of an acyloin and a benzoil. (Author)

AD-627 269 See Fld. 7/5

AD-627 278 See Fld. 7/4

AD-627 300 See Fld. 5/1

AD-627 308 See Fld. 11/10

AD-627 319 See Fld. 11/9

AD-627 490 See Fld. 7/5

AD-627 497 See Fld. 7/4

AD-627 498 See Fld. 7/4

AD-627 499 See Fld. 7/4

AD-627 500 See Fld. 7/4

AD-627 501 See Fld. 7/4

AD-627 502 See Fld. 7/4

AD-627 503 See Fld. 7/4

AD-627 504 See Fld. 7/4

AD-627 512 See Fld. 20/2

AD-627 513 See Fld. 20/2

AD-627 558 See Fld. 7/4

AD-627 560 See Fld. 7/4

AD-627 618 See Fld. 20/3

AD-627 639 See Fld. 11/9

AD-627 640 See Fld. 11/9

AD-627 666 See Fld. 7/2

AD-627 705 See Fld. 20/12

AD-627 825 See Fld. 7/4

AD-627 871 See Fld. 6/1

AD-627 873 See Fld. 6/20

AD-627 955 See Fld. 20/2

AD-627 956 See Fld. 7/4

7/4. PHYSICAL CHEMISTRY

AD-627 274 Fld. 7/4
CFSTI Prices: HC $1.00 MF $0.50
LEICESTER UNIV (ENGLAND) DEPT OF CHEMISTRY
THE EFFECT OF ADDED ELECTROLYTES ON THE E. S. R. AND OPTICAL ABSORPTION OF METAL -AMMONIA SOLUTIONS.
Final rept.,
by M. C. R. Symons. Jan 65, 12p. Contract AF-EOAR-62-64
AFOSR 65-1938-Pt-1
Unclassified report

Descriptors: (*Alkali metals, Solutions), (*Ammonia, Solutions), (*Electrolytes, Solutions), Electron spin resonance, Absorption spectrum, Spectrum (Visible + ultraviolet), Spectrum (Infrared), Concentration (Chemistry), Alkali metal compounds, Halides, Thermal properties, Ionization, Electrons, Great Britain

The electron spin resonance of solutions of alkali metals in liquid ammonia was studied as a function of the concentration of metal and of added alkali metal halides. When the concentration of metal is small (< 0.01 m) there are small negative deviations in the g-factor for added chlorides and bromides but very large negative deviations for added iodides, the shifts for a given salt molality being then a function of the cation. The visible and near infrared absorption spectra of some of these solutions have been measured and the appearance of a shoulder in the 12,500/cm region was confirmed. These results are discussed in terms of a specific interaction between unpaired electrons and iodide ions. Evidence that solvated electrons are quite strongly confined to cavities in the solvent is summarised, and a simple model is suggested which links the optical properties of solvated electrons to those of F centres in alkali-halide crystals and to those of solvated halide ions. (Author)

AD-627 278 Fld. 7/4, 7/3
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
USE OF EPR (ELECTRON PARAMAGNETIC RESONANCE) FOR THE STUDY OF ACTIVE CENTERS IN LIQUID PHASE OXIDATION REACTIONS,
by Ya. A. Lebedev, V. F. Tsepalov, and V. Ya. Shlyapintokh. 3 Jan 66, 12p. Rept. no. FTD-TT-65-1199
TT 66-60416
Unclassified report

Unedited rough draft trans. of mono. Soveshchaniya po Fizicheskim Metodam Issledovaniya Organicheskikh Soedinenii i Khimicheskikh Protsessov 10-17 Maya 1962, Trudy, Frunze, 1964 p190-5.

Descriptors: (*Free radicals, Concentration (Chemistry)), (*Paramagnetic resonance, Free radicals), (*Oxidation, Reaction kinetics), Peroxides, Hydrocarbons, Cumenes, Stearates, Nitriles, Carbonates, Liquids, USSR

By the method of electron paramagnetic resonance cumene peroxide radicals were detected in the reaction of cumene oxidation, catalyzed by cobalt stearate or initiated azobisisobutyronnitrile and dicyclohexlpercarbonate. Stationary concentrations of radicals were measured at various initiation rates in conditions of going oxidation reaction. The concentration of peroxide radicals, calculated by known values of rates of initiation and by the value of recombination velocity constant, are measured. (Author)

AD-627 298 Fld. 7/4, 7/2, 8/7
MCMASTER UNIV HAMILTON (ONTARIO)
QUADRUPOLE COUPLING TENSOR FOR B11 IN DATOLITE, HCABSIO5,
by K. C. Lal, and H. E. Petch. 9 Apr 65, 3p.
Unclassified report

Supported by Defense Research Board of Canada.

Availability: Published in The Journal of Chemical Physics, v43 n5 p1834-5 1 Sep 1965. Copies to DDC users only.

Descriptors: (*Boron compounds, Chemical bonds), (*Boron, Nuclear magnetic resonance), Silicates, Quadrupole moments, Calcium compounds, Tensor analysis, Crystal structure, Canada

A quadrupole coupling constant of 172 kc/sec was obtained for boron-11 in the borosilicate datolite. This falls within the range 50-700 kc/sec observed for tetrahedral cordination in the hydrated borates and, taken with other evidence, indicates a similar coordination in datolite, but with a markedly different linkage arrangement.

AD-627 299 Fld. 7/4, 7/2, 8/7
MCMASTER UNIV HAMILTON (ONTARIO)
B11 QUADRUPOLE COUPLING TENSORS IN THE HYDRATED BORATES. I. THE TUNELLITE POLYANTON,
by J. D. Cuthbert, W. T. MacFarlane, and H. E. Petch. 4 Mar 65, 6p.
Unclassified report

Supported by Defense Research Board of Canada.

Availability: Published in The Journal of Chemical Physics, v43 n1 p173-7 1 Jul 1965. Copies to DDC users only.

Descriptors: (*Borates, Chemical bonds), (*Boron, Nuclear magnetic personance), Hydrates, Quadrupole moments, Tensor analysis, Strontium compounds, Crystal structure, Single crystals, Ions, Canada

The quadrupolar splitting of the B11 nuclear magnetic resonance signals was investigated in a single crystal of tunellite, SrO.3B2O3.4H2O. The electric quadrupole coupling constants, eqQ/h, and asymmetry parameters, eta, of the electric field gradient tensors at the six unique boron sites were determined. The orientations of the principal axes of the electric field gradient tensors at all boron sites were also determined. The NMR results are in agreement with the crystal structure as to numbers and coordinations of the boron atoms and orientation of the planes of the triangularly coordinated boron atoms. The values found for eqQ/h and eta at the triangular sites are quite typical, but the eqQ/h values for the tetrahedral sites are significantly higher than normal. This may be due to the fact that the three tetrahedrally coordinated boron atoms are bonded to one oxygen atom in common, a situation which, among the hydrated borates whose structures are known, is unique to the tunellite-type polyanion. (Author)

AD-627 301 Fld. 7/4, 7/2, 8/7
MCMASTER UNIV HAMILTON (ONTARIO)
B11 QUADRUPOLE COUPLING TENSORS IN THE HYDRATED BORATES. II. THE PENTABORATE POLYANION,
by K. C. Lal, and H. E. Petch. 4 Mar 65, 8p.
Unclassified report

Supported by Defence Research Board of Canada. See also AD-627 299.

Availability: Published in The Journal of Chemical Physics, v43 n1 p178-84 1 Jul 1965. Copies to DDC users only.

Descriptors: (*Borates, Chemical bonds), (*Boron, Nuclear magnetic resonance), Hydrates, Sodium compounds, Calcium compounds, Potassium compounds, Quadrupole moments, Tensor analysis, Single crystals, Crystal structure, Ions, Electric fields, Canada

The quadrupolar splitting of the B11 nuclear magnetic resonance signal was investigated in potassium pentaborate tetrahydrate, KB5O6(OH)4.2H2O, and ulexite, NaCaB5O6(OH)6.5H2O. In the case of the former material, a good single crystal was available, permitting a complete determination of the quadrupole coupling tensors at the single unique tetrahedral site and at the two unique triangular boron sites. A complete determination of the tensors was not possible in the case of ulexite because of the fibrous nature of the material but, by combining single-crystal and powder techniques, it was possible to identify unambiguously three tetrahedral and two triangular boron sites and to set upper and lower limits on the quadrupole coupling constants. The electric quadrupole coupling constants eqQ/h and asymmetry parameters eta of the electric-field gradient tensors at the boron sites were determined. The orientations of the principal axes of the electric -field gradient tensors were also determined for potassium pentaborate tetrahydrate. The NMR results are in complete agreement with the crystal structures of both compounds as to numbers and coordinations of the boron atoms and as to the nature of the boron-oxygen polyanions. (Author)

AD-627 302 Fld. 7/4, 20/8
CFSTI Prices: HC $3.00 MF $0.75
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND APPLIED PHYSICS
THE MAGNETIC SCATTERING OF NEUTRONS BY NICKEL.
Technical rept.,
by Herbert A. Mook Jr.. Nov 65, 98p. Contract SD-88
ARPA 17
Unclassified report

Descriptors: (*Atomic structure, Magnetic fields), (*Nickel, Atomic structure), (*Neutron scattering, Nickel), Electrons, Magnetic moments, Field theory, Neutron beams

By using the neutron as a probe, precise information can be obtained about the spatial distribution of the magnetic moment density in a ferromagnet that is quite free of theoretical approximations. By comparison of the measured form factors with free atom form factors, and by direct calculation of the magnetic moment density from the measured neutron data, it was found that the magnetic moment distribution in iron and cobalt agreed with a model of the magnetization that imposed free atom-like distributions on a constant negative background. It was also discovered that the magnetic moment density was quite asymmetric about the nuclei in iron but almost spherical in cobalt. It was apparent that it would be valuable to know distribution of the magnetic moment density in nickel so that it could be compared with that of iron and cobalt. The magnetic scattering amplitude for nickel was determined for the first 27 Bragg reflections. The magnetic form factor was Fourier transformed to give a three-dimensional map of the magnetic moment density directly from the measured data. The map shows clearly the asymmetry in the magnetic moment distribution.

AD-627 315 Fld. 7/4, 20/13, 7/2
LITTLE (ARTHUR D) INC CAMBRIDGE MASS
THE THERMODYNAMICS OF VAPORIZATION IN THE BERYLLIUM OXIDE-BORON OXIDE SYSTEM,
by Paul E. Blackburn, and Alfred Buchler. 8 Jul 65, 6p. Contract AF 49(638)-1171 ,DA-19-020-ORD-5584
AROD 006:12
Unclassified report

Availability: Published in Journal of Physical Chemistry v69 p4250-5 1965. Copies to DDC users only.

Descriptors: (*Beryllium compounds, Vaporization), (*Boron compounds, Vaporization), (*Vaporization, Thermodynamics), (*Borates, Thermodynamics), Phase studies, Oides, Mass spectrum, Differential thermal analysis, Heat of reaction, Entropy, Chemical bonds, Gases

Vaporization and the phase relationships in the beryllium oxide-boron oxide system were studied by Knudsen effusion using a vacuum balance and a mass spectrometer and by differential thermal analysis. Gaseous beryllium metaborate, Be(BO2)2, was identified mass spectrometrically in the vapor above the system. Solid Be3B2O6 (m.p. 1495 plus or minus 5C) was found to be the only condensed mixed oxide. The following thermody-

namic values were obtained for the formation of gaseous beryllium metaborate from beryllium oxide and gaseous boron oxide: BeO (c) + B2O3 (g) = Be (BO2)2 (g) (heat of reaction = 22 plus or minus 5 kcal./mole; entropy = 6 plus or minus 2 e.u./mole). For the formation of solid Be3B2O6 from the condensed oxides, 3BeO (c) + B2O3 (l) = Be3B2O6 (c) (heat of formation = -23 plus or minus 5 kcal./mole; entropy = -13 plus or minus 3 e.u./mole). The metal-anion bond strengths in the gaseous lithium and beryllium metaborates show the same relation to each other as the bond strengths in the corresponding chlorides, thus further confirming the pseudohalide character of the gaseous metaborates. (Author)

AD-627 346 Fld. 7/4, 14/2
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
LOGARITHMIC SWEEP FOR USE IN DISPLAY OF LONG PULSES IN ELECTROCHEMICAL TRANSIENT MEASUREMENTS.
Interim rept.,
by C. H. Presbrey Jr.. 5 Jan 66, 7p. Rept. no. NRL-6355
Proj. SR-007-12-01-0809 ,RR-001-01-43-4754

Unclassified report

Descriptors: (*Electrochemistry, Display systems), (*Oscilloscopes, Electrochemistry), Circuits, Sweep generators, Amplifiers, Transients

The incorporation of a logarithmic sweep in an oscilloscope would be useful in the study of certain timepotential changes occurring at electrode surfaces. Highquality oscilloscope circuitry was modified to accommodate experimental log adapter units. With careful adjustment, the final circuit can provide an accurate one, two, or three decade logarithmic sweep in a display range from 5 to 10,000 microsec. Inherent limitations in the oscilloscope circuitry reduce accuracy in the 1-microsec range of the log sweep. Improved performance at the initiation of the sweep is dependent upon the development of superior horizontal sweep generator and amplifier circuitry. (Author)

AD-627 356 Fld. 7/4
CFSTI Prices: HC $1.00 MF $0.50
LITTLE (ARTHUR D) INC CAMBRIDGE MASS
CATION EXCLUSION FROM GELS,
by Ralph A. Horne. 1 Feb 66, 8p. Rept. no. TR-19
Contract Nonr-4424 (00) Proj. NR-051-460

Unclassified report

Descriptors: (*Gels, Ions), (*Water, Molecular association), (*Molecular association, Water), Porosity, Electrolytes, Solutions, Viscosity

The enhanced water-structure at interfaces excludes ions from the pores of gels. This ion exclusion depends on the water structure altering properties of the cations and is thus related to their viscosity B-coefficients. (Author)

AD-627 454 Fld. 7/4
INSTITUTE FOR MOLECULAR PHYSICS UNIV OF MARYLAND COLLEGE PARK
POTENTIAL CURVES FOR THE OBSERVED STATES OF N2 BELOW 11 EV.
Revised ed.,
by William Benesch, Joseph T. Vanderslice, S. G.Tilford, and P. G. Wilkinson. 12 May 65, 14p.
Contract NsG-398
AROD 4251:6

Unclassified report

Revision of manuscript submitted 7 Apr 65.

Availability: Published in The Astrophysical Journal v142 n3 p1227-40 Oct 1 1965. Copies to DDC users only.

Descriptors: (*Nitrogen, Molecular spectroscopy), (*Molecular spectroscopy, Nitrogen), Potential theory, Numerical analysis, Diatomic molecules, Molecular energy levels

AD-627 483 Fld. 7/4, 20/12
ILLINOIS UNIV URBANA
DETAILED BALANCE IN OPTICAL TRANSITIONS IN MOLECULES AND SOLIDS,
by W. Beall Fowler, and D. L. Dexter. 10 Mar 65, 5p. Contract AF-AFOSR-611-64
AFOSR 65-2092

Unclassified report

Prepared in cooperation with Rochester Univ., N. Y.

Availability: Published in The Journal of Chemical Physics, v43 n5 p1768-72 1 Sep 1965. Copies to DDC users only.

Descriptors: (*Electron transitions, Probability), (*Crystal lattices, Relaxation time), (*Molecules, Electron transitions), Color centers, Impurities, Molecular energy levels, Wave functions, Optical properties, Photons, Phonons

Recent theoretical and experimental work has shown that the simplest form of the Einstein equation relating induced absorption and spontaneous emission probabilities (characterized by sigma and 1/tau is not generally valid for impurities or color centers in solids, liquids, or molecules. Separate computations of these probabilities in systems exhibiting sizeable Stokes's shifts resolve some of the problems; they also disclose the difficulties involved in obtaining any connection between sigma and tau. Here we consider how the transition probabilities between a pair of electronic-vibrational states are related. Observable quantities, i.e., integrated absorption cross section and the radiative decay time, involve sums and average over the vibrational states, and no definite theoretical information relates these quantities. However, there is a simple connection between induced and spontaneous emission probabilities. New experiments which could yield information about the rate of lattice relaxation are suggested from this point of view. (Author)

AD-627 487 Fld. 7/4
CORNELL AERONAUTICAL LAB INC BUFFALO N Y
MECHANISMS OF SURFACE RECOMBINATION FROM STEP-FUNCTION FLOWS OF ATOMIC OXYGEN OVER NOBLE METALS,
by A. L. Myerson. 22 Jun 64, 9p. Contract AF49 (638)-782
AFOSR 65-1711

Unclassified report

Availability: Published in The Journal of Chemical Physics, v42 n9 p3270-6 1 May 1965. Copies to DDC users only.

Descriptors: (*Recombination reactions, Surfaces), (*Catalysts, Recombination reactions), Oxidation, Reaction kinetics, Films, Silver, Gold, Platinum, Palladium, Titanium compounds, Oxides, Chemical bonds

Surface recombination on four noble metals and titanium dioxide has been studied in flows containing a step-function increase in oxygen atom concentration. This has been accomplished by means of thin-film heat-transfer techniques using catalytic and noncatalytic films. It is shown that silver, gold, platinum, palladium, and titanium dioxide all have the same small, but significant, catalytic efficiency during the first 50 or so msec of their initial exposure to atomic oxygen but that oxides are quickly formed on the metal surfaces which determine the catalytic ability during succeeding exposure. In some cases, these oxides are unstable and quickly converted to other oxides of different catalytic efficiency which determine the final catalytic properties of the metal. It is also shown that the better recombination catalysts are those for which the average metal-oxygen bond energies of the oxides are weaker. (Author)

AD-627 497 Fld. 7/4, 7/3
FRICK CHEMICAL LAB PRINCETON UNIV N J
MICROWAVE ABSORPTION AND MOLECULAR STRUCTURE IN LIQUIDS. LVIII. THE DIELECTRIC RELAXATIONS, INFRARED SPECTRA, AND INTRAMOLECULAR HYDROGEN BONDING OF 2,6-DICHLOROP-NITROANILINE AND FOUR SUBSTITUTED PHENOLS,
by Arthur A. Antony, Francis K. Fong, and Charles P.Smyth. 20 Apr 64, 6p.
AROD 2364:18

Unclassified report

See also AD-627 504.

Availability: Published in Journal of Physical Chemistry v68 n8 p2035-9 Aug 1964. Copies to DDC users only.

Descriptors: (*Microwave spectroscopy, Molecular structure), (*Molecular structure, Liquids), (*Phenols, Physical properties), (*Organic nitrogen compounds, Physical properties), Absorption spectrum, Chlorine compounds, Bromine compounds, Dielectric properties, Spectra (Infrared), Molecular association, Chemical bonds, Relaxation time, Nitrophenols

The dielectric constants and losses of dilute benzene solutions of 2,6-dibromophenol, 2,6-dibromo-p-nitrophenol, 2,6-dichloro- p-nitrophenol, 2,4-dibromophenol, and 2,6-dichloro- p-nitroaniline were measured at 20, 40, and 60C at several microwave frequencies and used to calculate the dielectric relaxation times. The infrared spectra in the OH stretching region were measured for solutions of 2,6-dibromo- p-nitrophenol, 2,6-dibromophenol, 2,4-dibromophenol, and o-bromophenol. 2,6-Dibromo- p-nitrophenol and 2,6-dichloro- p-nitrophenol behave as rigid molecules, but 2,6-dibromophenol can be treated in terms of two relaxation times, one due to molecular rotation and the other due to OH group rotation. 2,4-Dibromophenol probably has more than two relaxation times. The dipole moment of this molecule can be interpreted in terms of the two conformations in which the OH is coplanar with the benzene ring. (Author)

AD-627 498 Fld. 7/4, 7/3
FRICK CHEMICAL LAB PRINCETON UNIV N J
MICROWAVE ABSORPTION AND MOLECULAR STRUCTURE IN LIQUIDS. LXII. THE THREE DIELECTRIC DISPERSION REGIONS OF THE NORMAL PRIMARY ALCOHOLS,
by S. K. Garg, and C. P. Smyth. 22 Oct 64, 9p.
Contract DA-31-124-AROD-109
AROD 2364:19

Unclassified report

See also AD-627 560.

Availability: Published in Journal of Physical Chemistry v69 n4 p1294-1301 Apr 1965. Copies to DDC users only.

Descriptors: (*Microwave spectroscopy, Molecular structure), (*Molecular structure, Liquids), (*Alcohols, Dielectric properties), Absorption spectrum, Relaxation time, Propanols, Butanols, Pentanols, Molecular association, Chemical bonds, Stereochemistry

The dielectric constants and losses of the ten normal alcohols from propyl through dodecyl were measured at 20, 40, and 60C at 16 wave lengths from 30,000 to 0.22 cm. The data were analyzed to obtain three different relaxation times for each alcohol, one in the region from 1 to 22 X 10 to the -10th power sec., one in the region from 1.7 to 5 X 10 to the -11th power sec., and one in the region from 1.7 to 4 X 10 to the -12th power sec. The long relaxation time is attributed, as in previous inter-

pretations, to breaking of the hydrogen bonds in molecular aggregates followed by ROH rotation. The intermediate relaxation time is that characteristic of rotation of the free, monomeric molecule, and the short relaxation time is that for the relaxation of the hydroxyl group by rotation around its C-O bond. (Author)

AD-627 499 Fld. 7/4, 7/3
FRICK CHEMICAL LAB PRINCETON UNIV N J
MICROWAVE ABSORPTION AND MOLECULAR STRUCTURE IN LIQUIDS. LXIII. DIELECTRIC BEHAVIOR OF RIGID POLAR MOLECULES AT 2.2-MM WAVELENGTH AND ATOMIC POLARIZATION,
by S. K. Garg, and C. P. Smyth. 21 Oct 64, 6p.
Contract DA-31-124-ARO (D)-109
AROD 2364:20
Unclassified report

See also AD-627 498.

Availability: Published in Journal of Chemical Physics v42 n4 p1397-1401 Feb 1965. Copies to DDC users only.

Descriptors: (*Microwave spectroscopy, Molecular structure), (*Molecular structure, Liquids), (*Halogenated hydrocarbons, Dielectric properties), (*Heterocyclic compounds, Dielectric properties), Absorption spectrum, Relaxation time, Fluorine compounds, Chlorine compounds, Bromine compounds, Benzenes, Naphthalenes, Thiophenes, Furans, Chloroform, Refractive index, Molecules, Atoms, Polarization

Dielectric constants and losses of fluorobenzene, chlorobenzene, bromobenzene, alpha-chloro- and alphabromonaphthalene, thiophene, tetrahydrofuran, and chloroform were measured at 2.2-mm wavelength at various temperatures between 20 and 55C. The results were used together with the existing lower-frequency data to construct Cole-Cole arc plots, from which relaxation times, distribution parameters and optical dielectric constants are obtained. In all cases studied the optical dielectric constant (ODC) has a value close to the square of the refractive index, and there seems to be no evidence of the additional ultrahigh-frequency dispersion region suggested by the results of previous workers. The values of ODC obtained were used to calculate atomic polarizations which generally agree well with the values determined for the molecules in the gaseous state. (Author)

AD-627 500 Fld. 7/4, 7/3
FRICK CHEMICAL LAB PRINCETON UNIV N J
MICROWAVE ABSORPTION AND MOLECULAR STRUCTURE IN LIQUIDS. LXIV. THE DIELECTRIC BEHAVIOR OF MIXTURES OF POLAR NONASSOCIATIVE LIQUIDS,
by Edward Forest, and Charles P. Smyth. 30 Nov 64, 5p. Contract DA-31-124-AROD-109
AROD 2364:21
Unclassified report

See also AD-627 499.

Availability: Published in Journal of Physical Chemistry v69 n4 p1302-5 Apr 1965. Copies to DDC users only.

Descriptors: (*Microwave spectroscopy, Molecular structure), (*Molecular structure, Liquids), (*Aromatic compounds, Dielectric properties), (*Halogenated hydrocarbons, Dielectric properties), Absorption spectrum, Mixtures, Chlorine compounds, Bromine compounds, Benzenes, Naphthalenes, Density, Viscosity, Relaxation time, Refractive index, Chemical bonds

Dielectric constants and losses were measured at wave lengths of 575 m., 10.0, 3.22, and 1.25 cm. at 25C for four binary mixtures of chlorobenzene, bromobenzene, 1-chloronaphthalene, and 1-bromonaphthalene, and for solutions of 1-bromonaphthalene and 1-chloronaphthalene in benzene. The densities and viscosities were also determined. The dielectric data of the binary mixtures have been interpreted in terms of two partly superimposed Debye regions whose relative contributions are in the same ratio as the molar concentrations of the components. The results for these binary systems are consistent with the assumption that the relaxation processes are those of molecules rather than larger liquid regions as proposed by some earlier workers for systems which they investigated. (Author)

AD-627 501 Fld. 7/4, 7/3, 14/2
FRICK CHEMICAL LAB PRINCETON UNIV N J
MICROWAVE ABSORPTION AND MOLECULAR STRUCTURE IN LIQUIDS. LXV. A PRECISE MICHELSON INTERFEROMETER FOR MILLIMETER WAVELENGTHS AND THE DIELECTRIC CONSTANTS AND LOSSES OF SOME LOW-LOSS LIQUIDS AT 2.1 MM,
by S. K. Garg, H. Kilp, and C. P. Smyth. 11 Jun 65, 7p. Contract DA-31-124-AROD-109
AROD 2364:22
Unclassified report

See also AD-627 500.

Availability: Published in Journal of Chemical Physics v43 n7 p2341-6 1 Oct 1965. Copies to DDC users only.

Descriptors: (*Microwave spectroscopy, Molecular structure), (*Molecular structure, Liquids), (*Interferometers, Millimeter waves), (*Monocyclic compounds, Dielectric properties), Absorption spectrum, Chlorine compounds, Benzenes, Carbon tetrachloride, Aliphatic compounds, Cyclohexanes, Toluenes, O-heterocyclic compounds, Relaxation time

The theory and apparatus for a Michelson interferometer for the precise measurement of dielectric constant and loss of liquids at 2.1-mm wavelength are described. The probable error of the dielectric-constant measurements is 0.2%. The probable error of the loss measurements is 2% or =0.0002, whichever is higher. The dielectric constants and losses of dilute solutions of chlorobenzene in benzene were measured at 2.1-mm wavelength at 20C and compared in the light of existing lower-frequency data. The dielectric constants and losses of several nonpolar and slightly polar liquids also were measured at 2.1-mm wavelength at 20C. The presence of appreciable losses in benzene and carbon tetrachloride was confirmed. Measured losses in cyclohexane and n-heptane are considerably lower than those in benzene and carbon tetrachloride. (Author)

AD-627 502 Fld. 7/4, 7/2, 7/3
FRICK CHEMICAL LAB PRINCETON UNIV N J
MICROWAVE ABSORPTION AND MOLECULAR STRUCTURE IN LIQUIDS. LXVI. THE DIELECTRIC RELAXATION OF THE WATER-DIOXANE SYSTEM AND THE STRUCTURE OF WATER,
by S. K. Garg, and C. P. Smyth. 28 Jun 65, 8p.
Contract DA-31-124-AROD-109
AROD 2364:23
Unclassified report

See also AD-627 501.

Availability: Published in Journal of Chemical Physics v43 n9 p2959-65 1 Nov 1965. Copies to DDC users only.

Descriptors: (*Microwave spectroscopy, Molecular structure), (*Molecular structure, Liquids), (*Water, Dielectric properties), (*O-heterocyclic compounds, Dielectric properties), Absorption spectrum, Molecular association, Relaxation time, Chemical bonds, Heat of activation, Entropy, Polarization

The dielectric constants and losses of a series of mixtures of water and dioxane (0.2-0.8 mole fraction) were measured at wavelengths of 0.217, 1.223, 3.193, and 10.09 cm, and 575 m and temperatures of 1, 10, 25, 40, and 55C. The results show that the mixtures have two dielectric relaxation times in contrast to the single time found for water. The results are interpreted as indicating a very rapidly fluctuating structure for pure water in which the molecules are constantly forming, breaking, and reforming hydrogen bonds to their neighbors. At any given instant there are unbonded molecules, as well as singly, doubly, triply, and quadruply bonded molecules, and molecules in all intermediate stages of bonding. However, the fluctuations of structure are so rapid that, averaged over the extremely short time required for dielectric relaxation, the molecules and their immediate environments are approximately the same. In the water-dioxane mixtures, the dioxane molecules alter the environments of some of the water molecules and thereby introduce a second relaxation time. (Author)

AD-627 503 Fld. 7/4, 7/3
FRICK CHEMICAL LAB PRINCETON UNIV N J
MICROWAVE ABSORPTION AND MOLECULAR STRUCTURE IN LIQUIDS. LV. INTRAMOLECULAR STRUCTURAL EFFECTS IN THE DIELECTRIC RELAXATION OF SIX AROMATIC COMPOUNDS,
by Edward Forest, and Charles P. Smyth. 12 Nov 63, 5p. Contract DA-31-124-AROD-109
AROD 2364:15
Unclassified report

Availability: Published in Journal of the American Chemical Society v86 p3474-7 5 Sep 1964. Copies to DDC users only.

Descriptors: (*Microwave spectroscopy, Molecular structure), (*Molecular structure, Liquids), (*Aromatic compounds, Dielectric properties), (*Ethers, Dielectric properties), (*Halogenated hydrocarbons, Dielectric properties), (*Nitriles, Dielectric properties), Absorption spectrum, Phenylethers, Acetonitriles, Naphthalenes, Benzenes, Xylenes, Relaxation time, Chemical bonds, Stereochemistry

The dielectric constants and losses at wave lengths of 1.3, 3.2, 10, and 25 cm. and 575 m. and temperatures of 20, 40, and 60C were measured for anisole, p-dimethoxybenzene, phenylacetonitrile, p-xylylene cyanide, 1-(chloromethyl)naphthalene and 1-naphthaleneacetonitrile in dilute benzene solution. The data were used to calculate the dielectric relaxation times of the molecules. p-Dimethoxybenzene and p-xylylene cyanide relax by the rotation of the methoxy and acetonitrile groups, respectively, about their bonds to the ring. The results for anisole have been interpreted in terms of a molecular and an intramolecular relaxation process, while, although more than one relaxation process is evident in the case of phenylacetonitrile, no resolution could be effected. 1- (Chloromethyl)naphthalene and 1-naphthaleneacetonitril show no evidence of intramolecular group rotation. confirming the steric blocking of group rotation by the hydrogen in the 8-position indicated by molecular models. (Author)

AD-627 504 Fld. 7/4, 7/3
FRICK CHEMICAL LAB PRINCETON UNIV N J
MICROWAVE ABSORPTION AND MOLECULAR STRUCTURE IN LIQUIDS. LVII. INTERPRETATION OF THE PARAMETERS FOR THE DIELECTRIC RELAXATIONS OF 2,6-DIMETHYLANISOLE AND 3,5-DIMETHYLANISOLE AND DIPOLE MOMENTS OF 17 AROMATIC COMPOUNDS,
by Francis K. Fong, and Charles P. Smyth. 11 Dec 63, 5p. Contract DA-31-124-AROD-109
AROD 2364:16
Unclassified report

See also AD-627 559.

Availability: Published in Journal of Chemical Physics v40 n8 p2404-7 Apr 15 1964. Copies to DDC users only.

Descriptors: (*Microwave spectroscopy, Molecular structure), (*Molecular structure, Liquids), (*Phenyl ethers, Dielectric properties), (*Aromatic compounds, Dipole moments), Absorption spectrum, Relaxation time, Refractive index, Stereochemistry, Polycyclic compounds

The dielectric constants and losses at wavelengths of 1.25, 3.22, 10.02, 24.99 cm, and 575 m were measured for 2,6-dimethylanisole and 3,5-dimethylanisole in benzene solutions at temperatures from 20C to 60C. Refractive indices were determined for the sodium D line at 34C. The data were analyzed in terms of two relaxation times, the values of the short relaxation times for 3,5-dimethylanisole being consistent with the intramolecular mechanism involving the methoxy group rotation. The significance of the parameters for dielectric relaxation is discussed. Dipole moments of seventeen compounds were calculated for the temperature range 20-60C from the static dielectric constants and indices of refraction in this and other papers of this series. The temperature dependence of the dipole moments of the 1,4-diacetobenzene molecule gives evidence of the hindered rotations of the acetyl groups. The presence of the two neighboring methyl groups appears to force the methoxy group out of the plane of the 2,6-dimethylanisole molecule, so that the dipole moment of 2,6-dimethylanisole is indistinguishable from that of 3,5-dimethylanisole. (Author)

AD-627 514 Fld. 7/4, 12/1
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF RESEARCH LABS
COMMENTS ON A PAPER BY C. S. SHARMA AND C. A. COULSON, 'HARTREE-FOCK AND CORRELATION ENERGIES FOR 1S2S 3S AND 1S STATES OF HELIUM -LIKE IONS'.
Revised ed.,
by J. Sokoloff. 20 Sep 65, 3p.

Unclassified report

Availability: Published in Proceedings of the Physical Society, v86 p1271-2 1965. Copies to DDC users only.

Descriptors: (*Hartree-Fock approximation, Ions), (*Atomic energy levels, Hartree-Fock approximation), Helium, Atomic orbitals, Wave functions

Though the notation is identical with that of the standard Hartree-Fock formalism, the 'Hartree-Fock parameter' of Sharma and Coulson cannot be taken as an off-diagonal Lagrangian multiplier for the general case of non-orthogonal orbitals. An alternative formulation of the singlet and triplet equations is derived in terms of standard Lagrangian multipliers in which the 'Hartree-Fock parameter' may be taken as an off-diagonal Lagrangian multiplier for either orthogonal or non-orthogonal orbitals. (Author)

AD-627 542 Fld. 7/4
MELLON INST PITTSBURGH PA
SELECTION RULES IN EXCITATION BY ELECTRON IMPACT,
by Edwin N. Lassettre. 29 Jan 65, 4p. Contract AF-AFOSR-61-63 Proj. AF-9767 Task 976702
AFOSR 65-2179

Unclassified report

Availability: Published in The Journal of Chemical Physics v42 n8 p2971-2 Apr 15 1965. Copies to DDC users only.

Descriptors: (*Selection rules, Excitation), (*Excitation, Electron bombardment), Atoms, Molecules, Perturbation theory, Quantum mechanics, Approximation (Mathematics)

The selection rules on excitation by electron impact which arise in first order perturbation theory (the Born approximation) are shown to hold as well in the second order approximation if redundant terms (which will largely be canceled in higher order approximations) are discarded. (Author)

AD-627 543 Fld. 7/4
MELLON INST PITTSBURGH PA
RELATIVE INTENSITIES OF TWO RYDBERG TRANSITIONS IN THE ELECTRON-IMPACT SPECTRUM OF WATER,
by Ausma Skerbele, Vincent D. Meyer, and Edwin N.Lassettre. 22 Mar 65, 4p. Contract AF-AFOSR-61-63
AFOSR 65-2175

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n3 p817-20 Aug 1 1965. Copies to DDC users only.

Descriptors: (*Water, Electron bombardment), (*Electron transitions, Water), Spectroscopy, Intensity, Molecular energy levels, Ionization potentials, Scattering, Excitation, Spectra (Visible + ultraviolet)

The electron-impact spectrum of water has been determined using a higher-resolution electron spectrometer. The intensity distribution of five peaks in the spectrum which belong to two different Rydberg transitions has been investigated at zero scattering angle and electron kinetic energy of 200 V. Quantities proportional to the optical oscillator strengths for these excitations were compared with absorption coefficients from ultraviolet spectra. The entire electron-impact spectrum in the region below the first ionization potential shows good agreement with ultraviolet absorption. (Author)

AD-627 554 Fld. 7/4, 4/1
OHIO STATE UNIV COLUMBUS DEPT OF CHEMISTRY
DETERMINATION OF MOLECULAR EXCITATION POTENTIALS BY ELECTRON IMPACT. AN ANOMALY IN THE N2 SPECTRUM,
by Edwin N. Lassettre, Frederic M. Glaser, Vincent D. Meyer, and Ausma Skerbele. 2 Sep 64, 9p. Contract AF19 (604)-4541 ,AF-AFOSR-61-63
AFOSR 65-2178

Unclassified report

Availability: Published in The Journal of Chemical Physics v42 n10 p3419-35 May 15 1965. Copies to DDC users only.

Descriptors: (*Nitrogen, Excitation), (*Electron bombardment, Nitrogen), Electron beams, Potential theory, Carbon dioxide, Spectra (Visible + ultraviolet), Electron transitions, Errors

An improved monochromator is described which provides an electron beam sufficiently homogeneous in energy so that peak widths range from 0.28 V at 400-V kinetic energy to 0.13 V at 150-V kinetic energy. Using this device excitation potentials were determined for CO2 and N2. The highest peak in the spectrum of N2 occurs at an excitation potential of 12.93 V while the most intense transition in the ultraviolet absorption spectrum, according to Huffman, Tanaka, and Larrabee, occurs at 12.74 V. This discrepancy exceeds the experimental error in the determination and indicates a failure of the Born approximation. (Author)

AD-627 555 Fld. 7/4, 4/1
OHIO STATE UNIV COLUMBUS DEPT OF CHEMISTRY
OSCILLATOR STRENGTHS OF SEVERAL PEAKS IN THE ELECTRON-IMPACT SPECTRUM OF CARBON DIOXIDE. SPIN-ORBIT COUPLING,
by Vincent D. Meyer, and Edwin N. Lassettre. 2 Sep 64, 8p. Contract AF19 (604)-4541 ,AF-AFOSR-61-63 Proj. AF-9767 Task 976702
AFOSR 65-2177

Unclassified report

Availability: Published in The Journal of Chemical Physics v42 n10 p3436-41 May 15 1965. Copies to DDC users only.

Descriptors: (*Carbon dioxide, Electron bombardment), (*Electron transitions, Carbon dioxide), Nuclear spins, Molecular orbitals, Spectroscopy, Excitation, Scattering, Probability

Electron-impact spectra of carbon dioxide were obtained at incident kinetic energies of 150, 200, 300 and 400 V. Oscillator strengths of four transitions are calculated from the spectra and compared with other determinations. Assignment of term symbols is discussed. (Author)

AD-627 556 Fld. 7/4
CFSTI Prices: HC $1.00 MF $0.50
UNIVERSITY OF WESTERN ONTARIO LONDON DEPT OF PHYSICS
IDENTIFICATION ATLAS OF MOLECULAR SPECTRA, 1: THE ALO A 2SIGMA-X 2SIGMA BLUE-GREEN SYSTEM,
by D. C. Tyte, and R. W. Nicholls. 10 Mar 64, 17p. Contract AF19 (628)-2820 ,AF-AFOSR-62-236A Proj. AF-9768 Task 976801
AFOSR 65-2315

Unclassified report

Descriptors: (*Aluminum compounds, Molecular spectroscopy), (*Molecular spectroscopy, Aluminum compounds), Band spectrum, Molecular structure, Canada, Oxides

The report contains a set of vibrationally identified spectrograms of the Blue-Green (A 2sigma - X 2sigma) system of aluminum oxide. A compilation of all the available molecular data on the states involved, a brief description of the appearance, occurrence and history of the system and a selected bibliography are also included. (Author)

AD-627 558 Fld. 7/4, 7/3
FRICK CHEMICAL LAB PRINCETON UNIV N J
DIELECTRIC PROPERTIES OF A BINARY MIXTURE OF POLAR LIQUIDS HAVING A CRITICAL SOLUTION TEMPERATURE,
by R. G. Quinn, and C. P. Smyth. 24 Jul 63, 6p.

Unclassified report

Availability: Published in The Journal of Chemical Physics v41 n7 p2037-41 Oct 1 1964. Copies to DDC users only.

Descriptors: (*Microwave spectroscopy, Liquids), (*Organic nitrogen compounds, Dielectric properties), (*Alcohols, Dielectric properties), Mixtures, Thermal properties, Relaxation time, Concentration (Chemistry)

The dielectric dispersion of a mixture of nitromethane and n-heptanol which has an upper critical solution temperature was measured over a range of 40C to the temperature of phase separation, and a frequency range from 0.5 Mc/sec to 23.8 kMc/sec. The frequency dependence of the complex dielectric constant can be adequately characterized by the superposition of two single relaxation times which may be associated with the two components. The temperature dependence of these two relaxation times was investigated. The dependence is in general by the type of components present, their respective concentrations, and the temperature. It was found that the dielectric dispersion process is affected at temperatures as much as 3 deg above the critical solution temperature. On the basis of the data, a number of conjectures

concerning the character of the relaxation process of other types of solutions were made. (Author)

AD-627 559 Fld. 7/4, 7/2
FRICK CHEMICAL LAB PRINCETON UNIV NJ
MICROWAVE ABSORPTION AND MOLECULAR STRUCTURE IN LIQUIDS. LVI. DIELECTRIC BEHAVIOR OF WATER AND HEAVY WATER IN DIOXANE.
Doctoral thesis,
by Colin J. Clemett, Edward Forest, and Charles P.Smyth. 10 Dec 64, 7p.
Unclassified report

Presented at the Div. of Physical Chemistry of the American Chemical Society in New York, Sep 63. See also AD-627 503.

Availability: Published in The Journal of Chemical Physics v40 n8 p2123-8 Apr 15 1964. Copies to DDC users only.

Descriptors: (*Microwave spectroscopy, Molecular structure), (*Molecular structure, Liquids), (*Water, Dielectric properties), (*Heavy water, Dielectric properties), Absorption spectrum, O-heterocyclic compounds, Relaxation time, Chemical bonds, Polarization, Molecular association

The dielectric constants and losses of seven water-dioxane mixtures and six heavy-water-dioxane mixtures ranging in concentration from 5 to 58 mole % of water were measured at wavelengths from 0.44 to 10.0 cm. The results are interpreted in terms of two partly superimposed noninteracting Debye dispersions. The high -frequency dispersion region for the water-dioxane mixtures corresponds to a relaxation time 4X10 to the -12th power sec, which is concentration independent, while the low-frequency dispersion region corresponds to a relaxation time which is concentration dependent and rises to a maximum at about 70 to 80 mole % water. The relaxation time 5.6X10 to the -12th power sec associated with the high-frequency dispersion region of the heavy-water -dioxane mixtures differs from the corresponding relaxation time for water-dioxane mixtures by a factor of (1/2) 0 to the 1/2 power. The low-frequency concentration -dependent relaxation time was found to be about 1.2 to 1.5 times greater than the corresponding relaxation time of the water-dioxane system. (Author)

AD-627 560 Fld. 7/4, 7/3
FRICK CHEMICAL LAB PRINCETON UNIV NJ
MICROWAVE ABSORPTION AND MOLECULAR STRUCTURE IN LIQUIDS. LX. INTRAMOLECULAR RELAXATION MECHANISMS IN AROMATIC ETHERS AND SEVERAL RELATED MOLECULES,
by James E. Anderson, and Charles P. Smyth. 4 Sep 64, 7p.
Unclassified report

See also AD-627 497.

Availability: Published in The Journal of Chemical Physics, v42 n2 p473-8 15 Jan 65. Copies to DDC users only.

Descriptors: (*Microwave spectroscopy, Molecular structure), (*Molecular structure, Liquids), (*Phenyl ethers, Relaxation time), (*Aromatic compounds, Relaxation time), (*Ethers, Relaxation time), Absorption spectrum, Dielectric properties, Chemical bonds, Dipole moments, Stereochemistry

The dielectric constants and losses of 11 aromatic ethers and related compounds in dilute benzene solution were measured at wavelengths between 1.25 and 50 cm at temperatures from 20 to 60C. The substances measured are dibenzyl ether, benzyl phenyl ether, dicyclohexyl ether, 2-nitrophenyl phenyl ether, m-diphenoxybenzene, 4-bromophenyl phenyl ether, 4-biphenyl phenyl ether, phenoxathiin, thianthrene, triphenylphosphine, and triphenylchloromethane. The dielectric relaxation times calculated from these data indicate that most of the seemingly small values obtained result from combination of short, coupled, ring rotations with over-all molecular rotation. Comparison of the dipole moment values calculated for twenty-three substituted phenyl ethers with the observed values gives no evidence of the large mesomeric moments seemingly necessary to make mesomeric charge shift a generally important factor in lowering the relaxation times of these molecules. The low relaxation time found for phenoxathiin probably results from combination of dipole orientation by a 'butterfly motion' of the nonplanar molecule with orientation by over-all molecular rotation. (Author)

AD-627 612 Fld. 7/4
CFSTI Prices: HC $1.00 MF $0.50
HARVARD COLL OBSERVATORY CAMBRIDGE MASS
ON THE SP2 CONFIGURATION AND SERIES PERTURBATIONS IN THE FIRST SPECTRUM OF INDIUM (IN I),
by W. H. Parkinson, E. M. Reeves, and W. R. S.Garton. Jan 66, 16p. Rept. no. Scientific-9 Contract Nonr-1866 (48) ,NsG-438
Unclassified report

Prepared in cooperation with Imperial Coll. of Science and Technology, London (England).

Descriptors: (*Indium, Absorption spectrum), Atomic energy levels, Perturbation theory

The absorption spectrum of shock-heated indium vapour has been photographed, and the missing member of the six-line group (2P (1/2,3/2) - sp2 2S, 2P) identified at 1824 A. The sp2 configuration and the series perturbation in In I has been reviewed and the term sp2 2D confirmed as the perturber of the 2D-series. (Author)

AD-627 629 Fld. 7/4
WINDSOR UNIV (ONTARIO) DEPT OF PHYSICS
EXCITATION TRANSFER BETWEEN THE 2P1/2 AND 2P3/2 RESONANCE LEVELS IN ALKALI ATOMS INDUCED BY INELASTIC COLLISIONS,
by G. D. Chapman, M. Czajkowski, A. G. A. Rae, and L. Krause. 1965, 8p. Contract AF-AFOSR-361-65 Proj. AF-9767 Task 976702
AFOSR 65-2060
Unclassified report

Availability: Published in International Conference on the Physics of Electronic and Atomic Collisions (4th), Laval Univ. (Quebec), Aug 2-6 1965. Copies to DDC users only.

Descriptors: (*Excitation, Alkali metals), (*Resonance, Atomic energy levels), Fluorescence, Inelastic scattering, Atoms, Rubidium, Cesium, Potassium

AD-627 656 Fld. 7/4, 21/9, 7/2
CFSTI Prices: HC $1.00 MF $0.50
NATIONAL RESEARCH CORP CAMBRIDGE MASS NORTON EXPLORATORY RESEARCH DIV
THERMOCHEMISTRY OF SELECTED COMPOUNDS.
Annual summary rept. 15 Nov 64-14 Nov 65,
by Ludwig G. Fasolino. 17 Jan 66, 14p. Contract Nonr-3608 (00)
Unclassified report

See also AD-608 999.

Descriptors: (*Thermochemistry, Aluminum compounds), (*Aluminum compounds, Thermochemistry), (*Borohydrides, Thermochemistry), (*Powder metals, Hydrolysis), (*Rocket propellants, Thermochemistry), Heat of formation, Calorimetry, Water vapor, Hydrochloric acid, Heat of reaction

Aluminum borohydride and SAP were studied calorimetrically in an effort to derive their heats of formation. Much thermal and analytical data were collected in this search for the proper reaction conditions which will yield the useful information sought. The SAP material has reacted quickly and completely with water and the thermal data were consistent. The aluminum borohydride hydrolysis is our preferred reaction but as yet the results are not as consistent as desired. These hydrolysis studies are currently being carried out isothermally at 0C. The analytical support data is most useful and essential in this study. (Author)

AD-627 703 Fld. 7/4, 20/4
GENERAL APPLIED SCIENCE LABS INC WESTBURY N Y
SOME EFFECTS OF TURBULENT FLUCTUATIONS ON AIR IONIZATION REACTION RATES IN HYPERSONIC WAKES.
Technical rept.,
by Arthur Rubel, and Seymour L. Zeiberg. 1965, 12p. Rept. no. GASL-TR-562
Unclassified report

Presented at AIAA Aerothermochemistry of Turbulent Flows Conference, San Diego, Calif. 13-15 Dec 1965.

Availability: Available from American Institute of Aeronautics and Astronautics, 1290 Avenue of the Americas, New York, N. Y. AIAA Paper No. 65-819. HC $1.00. (Member $0.50).

Descriptors: (*Air, Gas ionization), (*Gas ionization, Reaction kinetics), (*Hypersonic flow, Wake), (*Turbulence, Gas ionization), Dissociation, Recombination reactions, Nitrogen compounds, Oxides, Nitrogen, Oxygen

The source terms of the chemical rate equations for air ionization processes which occur in hypersonic wakes are perturbed, and then averaged. The resulting expressions are grouped such that the rate equations retain the form of mean-flow equations, but with modified rate constants which depend on various correlations of flow property fluctuations. The processes considered are N + O reversibly yields NO (+) + e (-) and 2O2 + e (-) reversibly yields O2 + O2 (-). Order of magnitude quantitative estimates are shown for the 'apparent' rate constants. (Author)

AD-627 719 Fld. 7/4
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING
THE IONICITY OF GAAS,
by F. A. Kroger. 26 Feb 65, 3p. Contract AF-AFOSR-496-65 Proj. AF-4751
AFOSR 65-2062
Unclassified report

Availability: Published in Physics Letters, v15 n3 p218 1 Apr 1965. Copies to DDC users only.

Descriptors: (*Gallium alloys, Arsenic alloys), Polarization, Chemical bonds

From recent (200) x-ray reflection intensity measurements of GaAs, it may be deduced that Ga has a positive charge and As a corresponding negative charge of (0.51 = 0.13) unit charges. This polarity is not surprising in view of the difference in electro-negativity of Ga and As. The observed value for the static charge is close to the dynamic charge determined to be about 0.46 q from infrared reflection and dielectric and refractivity measurements. However, it is cautioned that this correspondence may be fortuitous. (Author)

AD-627 756 Fld. 7/4, 20/6
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF PHYSICS
NEW LINES IN ISOELECTRONIC SEQUENCES OF ARGON I FROM V VI TO NI XI AND IN ISOELECTRONIC SEQUENCES OF POTASSIUM I FROM CR VI TO CU XI,

by E. Alexander, U. Feldman, and B. S. Fraenkel. 14 Jan 65, 4p. Contract AF-EOAR-70-64
AFOSR 65-2553

Unclassified report

Availability: Published in Journal of the Optical Society of America v55 n6 p650-3 Jun 1965. Copies to DDC users only.

Descriptors: (*Gas ionization, Spectroscopy), (*Electron transitions, Ions), (*Line spectrum, Ions), Atomic energy levels, Argon, Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel, Copper

A method of differentiation between highly ionized specta has enabled extension of the argon I isoelectronic sequences of the 3p (5)4s and 3p (5)5s levels. A sequence of 3p (5) (2P3/2)4d and 3p (5) (2P1/2)4d levels is established. The potassium I isoelectronic sequences of 3p (6)3d-3p (6)nf transitions are also extended. Lines of the following ions are reported: V vi, Cr vi and vii, Mn viii, Fe viii and ix, Co ix and x, Ni x and xi, Cu xi. (Author)

AD-627 764 Fld. 7/4, 20/3, 20/2
CALIFORNIA UNIV LA JOLLA
ELECTRONIC STRUCTURE OF INDIUM-CADMIUM ALLOYS,
by M. F. Merriam. 21 May 65, 2p. Contract AF-AFOSR-631-64
AFOSR 65-2536

Unclassified report

Availability: Published in Physics Letters v17 n1 p16-7 15 Jun 1965. Copies to DDC users only.

Descriptors: (*Atomic energy levels, Superconductors), (*Indium alloys, Cadmium alloys), Band theory of solids, Crystal lattices

Recent measurements are reported of superconducting transition temperature and lattice parameter, in In-Cd alloys, which strongly support some aspects of Svechkarev's proposal. The measurements show an electronic structure effect which was inferred by Svechkarev.

AD-627 784 Fld. 7/4, 7/2
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
EFFECT OF PRESSURES (UP TO 4 KBAR) ON THE POLYMERIZATION OF LIQUID SELENIUM FROM MEASUREMENTS OF VISCOSITY,
by D. E. Harrison. 26 Mar 64, 8p. Contract AF49 (638)-1029 Proj. AF-9761 Task 976102
AFOSR 65-1999

Unclassified report

Availability: Published in The Journal of Chemical Physics, v41 n3 p844-9 1 Aug 1964. Copies to DDC users only.

Descriptors: (*Inorganic polymers, Selenium), (*Selenium, Polymerization), (*Polymerization, Selenium), Liquids, Viscosity, Measurement, Pressure, Viscosimeters, Melting, Chemical equilibrium, Molecular structure

The viscosity along the melting curve of selenium was deduced from measurements of the pressure dependence of viscosity taken at various temperatures between 220-350C and at pressures up to 4 kbar. The viscosity is shown to decrease to 1/5 its initial value at 6.0 kbar, then rise with further increase in pressure. Data reveal that the slope of the log10 viscosity vs 1/T sq (Degrees K) curve is independent of pressure up to at least 4.5 kbar. Analysis of the effect of pressure on the degree of polymerization in terms of the ring-chain equilibrium theory of Eisenberg and Tobolsky indicates that pressure has only a slight effect on the average chain length. Thus, the minimum in viscosity along the melting curve appears to be a balance between the effects of shorter chain length toward decreasing the viscosity and that of diminished free volume toward increasing the viscosity. (Author)

AD-627 814 Fld. 7/4
CFSTI Prices: HC $1.00 MF $0.50
UNIVERSITY OF WESTERN ONTARIO LONDON
IDENTIFICATION ATLAS OF MOLECULAR SPECTRA, 2: THE N2 C 3IIU-B 3IIG SECOND POSITIVE SYSTEM,
by D. C. Tyte, and R. W. Nicholls. 31 Oct 64, 19p. Contract AF19 (628)-2820 ,AF-AFOSR-62-236A
AFOSR 65-2316

Unclassified report

See also AD-627 556.

Descriptors: (*Molecular spectroscopy, Nitrogen), Molecular energy levels, Molecular structure, Molecular rotation, Atmosphere

This report contains a set of vibrationally identified spectrograms of the Second Positive (C 3IIu-B 3IIg) system of N2. A compilation of all the available molecular data on the states involved, a brief description of the appearance, occurrence and history of the system and a selected bibliography are also included. (Author)

AD-627 825 Fld. 7/4, 7/3
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
THE INSECT CORNEAL NIPPLE ARRAY; A BIOLOGICAL, BROAD-BAND IMPEDANCE TRANSFORMER THAT ACTS AS AN ANTIREFLECTION COATING,
by C. G. Bernhard, W. H. Miller, and A. R. Moller. 1965, 73p. Contract AF-EOAR-62-13, PHS-B-864
AFOSR 65-2730

Unclassified report

Availability: Published in Acta Physiologica Scandinavica v63 suppl1243 p9-79 1965.

Descriptors: (*Insects, Cornea), (*Cornea, Insects), (*Optical coatings, Insects), Electron microscopy, Morphology, Microstructure, Microwaves, Radar reflections, Spectrum (Visible + ultraviolet), Antiradar coatings, Simulation

In electronmicroscopic studies it was found that the corneal surface of the facets of certain insect compound eyes is completely covered with congruent cone-shaped protuberances. This nipple array was found in different species of moths, butterflies, netflies, mosquitos, and caddisflies but not in species of bees, houseflies, and dragonflies. The function of this nipple array was elucidated by microwave experiments on scaled dielectric models and by spectrophotometric investigations on insect corneas. The results were confirmed by the application of a mathematical model. It is concluded that the nipple array acts as an impedance transformer to match the characteristic impedance (inverse of refractive index) of air to that of the lens material (chitin) and thus functions to decrease reflection from the corneal front surface and concomitantly increase the transmission of light through the cornea over a broad wavelength range. The biological significance of the nipple array for camouflage and increased visibility is discussed.

AD-627 838 Fld. 7/4, 9/5
NORTH CAROLINA UNIV CHAPEL HILL DEPT OF CHEMISTRY
OPERATIONAL-AMPLIFIER, ALTERNATING-CURRENT POLAROGRAPH WITH ADMITTANCE RECORDING,
by John W. Hayes, and Charles N. Reilley. 21 Jul 65, 6p. Contract AF-AFOSR-584-64
AFOSR 65-2765

Unclassified report

Availability: Published in Analytical Chemistry v37 n11 p1322 Oct 1965. Copies to DDC users only.

Descriptors: (*Polarographic analysis, Amplifiers), Electrochemistry, Alternating current, Admittance, Automatic, Electronic recording systems

An alternating current polarograph, which permits automatic recording of the in-phase and quadrature components of the faradaic admittance, has been designed and constructed. Operational amplifiers are the basis of the instrumentation, but tuned amplifiers have been purposefully avoided. Phase selection is accomplished by multiplication of current and voltage signals by an electronic multiplier. Compensation for the effect of series resistance is made by subtraction of the iR drop from the voltage signal before multiplication using the predetermined value of the series resistance at drop fall. Noise levels have been reduced to a negligible level by the use of solid-state amplifiers in the low-signal level parts of the instrument. Stability is excellent, and results are within the expected limits of dummy-cell components. (Author)

AD-627 856 Fld. 7/4, 11/8, 11/11
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON DC
A SYSTEMATIC APPROACH TO THE BEHAVIOR OF METAL SOAP-OIL SYSTEMS,
by R. N. Bolster, and R. C. Little. 6 Jan 66, 15p. Rept. no. NRL-6361
Proj. RR-001-01-43-4750

Unclassified report

Descriptors: (*Oils, Solubility), (*Soaps, Solutions), Surface properties, Solvents, Viscosity, Greases, Colloids, Crystals, Stearates, Aluminum soaps

Application of the solubility parameter concept to micellar and crystalline metal soap dispersions in low -polarity solvents can give some order to effects of the solvent in these systems. The ASTM dropping point temperature is shown to be a function of solubility parameter, and it is proposed that dropping points can be estimated when solubility parameters are known. A new method for estimating the solubility parameter of an oil, based on its interaction with soap, is also suggested. (Author)

AD-627 954 Fld. 7/4, 20/6
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
ZEEMAN EFFECT IN THE 4F TO 5D SPECTRUM OF CE (3+) IN CAF2,
by M. H. Crozier. 21 Oct 64, 3p. Contract AF49 (638)-1468
AFOSR 65-2584

Unclassified report

Availability: Published in The Physical Review v137 n6A pA1781-3 15 Mar 1965. Copies to DDC users only.

Descriptors: (*Cerium, Absorption spectrum), (*Calcium compounds, Fluorides), Atomic energy levels, Electron transitions, Paramagnetic resonance

The Zeeman effect of the Ce (3+) ion with tetragonal charge compensation in CaF2 was studied at 4.2K. An absorption line at 3131.6 A was split with fields of 60 kG, and although all the components cannot be resolved, there is good agreement with epr results for the ground state. Axial stress results identify the upper state as having crystal quantum number mu = plus or minus 1/2. The occurrence of 4f (n) to 4f (n-)5d spectra in the trivalent rare earths is discussed. In an appendix, a result is established concerning the use of the Zeeman effect to identify the mu = plus or minus 1/2 mu = plus or minus 3/2 components of a cubic gamma-8 level split by a tetragonal distortion. (Author)

AD-627 956 Fld. 7/4, 7/3
STANFORD UNIV CALIF DEPT OF CHEMISTRY

DIPOLE MOMENTS IN RELATION TO CONFIGURATION OF N-ALKANE CHAINS BEARING ALPHA, OMEGA DIPOLAR SUBSTITUENTS,
by W. J. Leonard,Jr., R. L. Jernigan, and P. J. Flory. 6 Jun 65, 7p. Contract AF49 (638)-1341
AFOSR 65-2768

Unclassified report

Presented before the Division of Physical Chemistry of the American Chemical Society, 5 Apr 65.

Availability: Published in The Journal of Chemical Physics v43 n7 p2256-61 1 Oct 1965. Copies to DDC users only.

Descriptors: (*Alkanes, Dipole moments), (*AHalogenated hydrocarbons, Sterochemistry), (*Bromine compounds, Alkanes), (*Dipole moments, Alkanes), Chemical bonds, Molecular isomerism, Numerical analysis, Statistical analysis, Spectra (Infrared), Raman spectroscopy

The dipole moments of alpha, omega-dibromo-n-alkanes Br- (CH2)n-1-Br were treated by exact methods applicable to a linear sequence of bonds each constrained to choice among several discrete rotational states, due account being taken of neighbor dependence in assignment of statistical weights to the various configurations. Computations were carried out on the basis of threefold potentials with one trans and two gauche states for each bond. Successive gauche states of opposite sign are excluded by steric overlaps. An energy of 500 cal/mole was assigned to gauche relative to trans, in keeping with spectroscopic evidence for n-alkanes and the scheme successfully applied to the mean-square dimensions of polymethylene chains. Nonbonded interactions in which a Br atom is involved have been assigned statistical weights consistent with van der Waals radii and with evidence from Raman and infrared studies on n-alkyl bromides. The mean-square dipole moments averaged over all configurations are appreciably affected by the dipole-dipole interaction energy for n--1<6, but not for longer chains. Calculated values are in good accord with experimental results for n--1=3 to 10, inclusive. (Author)

AD-628 016 Fld. 7/4, 20/8
CFSTI Prices: HC $1.00 MF $0.50
GENERAL ELECTRIC CO SCHENECTADY N Y RESEARCH AND DEVELOPMENT CENTER
ATOMIC DISPLACEMENTS IN ONE- AND TWO-DIMENSIONAL DIFFUSION,
by Gert Ehrlich. Oct 65, 15p. Rept. no. 65-C-039
Contract AF49 (638)-1362
AFOSR 65-2769

Unclassified report

Descriptors: (*Diffusion, Brownian motion), (*Atoms, Transport properties), Statistical mechanics, Surface properties, Crystal lattices, Adsorption

The statistics of surface diffusion phenomena are developed for the conditions appropriate to measurements in the ion microscope. Examined in detail are: (1) the effect of boundaries (lattice steps) on the mean square displacement in a random walk; (2) the probability density for distances traversed in a two-dimensional walk along nonorthogonal surface channels; and (3) the distribution of distances for random walks in which the number of jumps is subject to fluctuation, as it is in real systems. Both reflecting and adsorbing boundaries are found to diminish the mean square displacement in the same fashion. The effect of nonorthogonality, and even more so of fluctuations, is to enhance the frequency of small displacements when compared with a Rayleigh distribution. (Author)

AD-628 026 Fld. 7/4
CFSTI Prices: HC $2.00 MF $0.50
WISCONSIN UNIV MADISON
SURFACE STUDIES BY SLOW ELECTRON DIFFRACTION.
Final rept.,
by M. B. Webb. 1965, 45p. Contract AF-AFOSR-51-63
AFOSR 65-2726

Unclassified report

Descriptors: (*Electron diffraction analysis, Silver), Surface properties, Crystal lattices, Thermal diffusion

The low energy electron diffraction from the surface of silver and its temperature dependence have been measured. From measurement of the Debye-Waller factor, it has been determined that the mean square thermal displacement normal to the surface of the surface atoms is 2.0 plus or minus 0.2 times that for the bulk atoms and that this excess amplitude falls to the bulk value approximately as e-n where n indexes the atomic plane. These results agree with the model calculations. However, these experiments indicate the excess thermal amplitude is nearly isotropic in disagreement with simple arguments and model calculations. This discrepancy may be due to non-ideal experimental surfaces. The diffuse scattering in the vicinity of the diffraction maxima has been identified as the thermal diffuse scattering. The expected thermal diffuse scattering for low energy electrons is calculated for a simple model. Experiments show the angular dependence, temperature dependence, dependence on the diffraction vector and the integrated intensity are those expected. The temperature measurements lead to independent determinations of the penetration of the electrons into the crystal. The penetration may be described by a linear absorption coefficient which is approximately proportional to the electron energy to the minus one-half power for energies between 50 and 300 e.v. The measurement of the diffuse scattering leads to the possibility of measuring the angular dependence of the atomic structure factor. (Author)

AD-628 027 Fld. 7/4, 20/5
CFSTI Prices: HC $1.00 MF $0.50
UTAH UNIV SALT LAKE CITY DEPT OF CHEMISTRY
LASER TEMPERATURE-JUMP STUDIES OF FAST REACTIONS.
Final technical rept., 1 Oct 63-30 Sep 65,
by Edward M. Eyring. 29 Dec 65, 7p. Rept. no. UUCD-2-64
Contract AF-AFOSR-476-64 Proj. AF-9710 Task 971003
AFOSR 65-2941

Unclassified report

Descriptors: (*Lasers, Chemical reactions), (*Reaction kinetics, Lasers), (*Uranyl radicals, Chemical equilibrium), (*Heavy water, Reaction kinetics), Ruby, Neodymium, Heaters, Water, Enzymes, Thermochemistry, Laboratory equipment

A ruby laser was assembled from commercial components for use as a single-pulse, source of heat in temperature-jump relaxation kinetic studies of very rapid reactions in aqueous and non-aqueous solutions. Preliminary results were obtained with an aqueous uranyl ion monomerdimer equilibrium to which copper nitrate was added. A neodymium doped glass laser rod radiating at 1.06 microns was not found satisfactory for the same purpose. A concurrent investigation of a fast protolytic reaction in water and D2O by the conventional Joule heating temperature-jump method yielded solvent D2O kinetic isotope effect data with ramifications for enzyme kinetics. (Author)

AD-627 387 See Fld. 20/13

AD-627 391 See Fld. 7/2

AD-627 410 See Fld. 21/2

AD-627 450 See Fld. 21/2

AD-627 546 See Fld. 20/12

AD-627 627 See Fld. 20/8

AD-627 658 See Fld. 10/1

AD-627 666 See Fld. 7/2

AD-627 815 See Fld. 20/6

AD-627 816 See Fld. 7/3

AD-627 829 See Fld. 7/3

AD-627 831 See Fld. 7/2

AD-627 832 See Fld. 7/2

AD-627 833 See Fld. 7/3

AD-627 836 See Fld. 7/2

AD-627 843 See Fld. 20/10

AD-627 875 See Fld. 7/3

AD-627 923 See Fld. 7/2

AD-627 978 See Fld. 21/9

7/5. RADIO AND RADIATION CHEMISTRY

AD-627 269 Fld. 7/5, 7/3
CFSTI Prices: HC $1.00 MF $0.50
PITTSBURGH UNIV PA DEPT OF CHEMISTRY
FREE RADICAL ATTACK ON TRIVALENT PHOSPHORUS DERIVATIVES.
Final scientific rept. 1 Oct 61-30 Sep 65,
by Claibourne E. Griffin. 30 Sep 65, 16p. Contract AF-AFOSR-62-48 ,AF-AFOSR-470-64
Proj. AF-9762 Task 976201
AFOSR 65-2009

Unclassified report

Descriptors: (*Free radicals, Organic phosphorus compounds), (*Organic phosphorus compounds, Photochemistry), (*Phosphines, Photochemistry), (*Phosphites, Photochemistry), (*Phosphonium compounds, Photolysis), Aromatic compounds, Oxidation, Halides, Physical properties, Chemical properties

Results of work in the following areas are reported: photoinitiated arylations of phosphines, phosphites, and other trivalent organophosphorus compounds; photoinitiated oxidation of trialkyl phosphites; photolyses of phosphonium halides, triaryl phosphines, trialkyl phosphites, and biphosphines; physical and analytical studies of various tri- and tetravalent organophosphorus compounds. A list of papers published as a result of the researches is included.

AD-627 490 Fld. 7/5, 7/3
IDAHO UNIV MOSCOW DEPT OF PHYSICAL SCIENCES
PHOTOISOMERIZATION OF ENDO- AND EXO-TRICYCLO /3.2.1.0 (2,4)/OCTENE-6,
by Peter K. Freeman, Donald G. Kuper, and V. N. Mallikarjuna Rao. 22 Jul 65, 7p. Contract AF-AFOSR-34-65 Proj. AF-9762 Task 976202
AFOSR 65-2042

Unclassified report

Availability: Published in Tetrahedron Letters, n37 p3301-4 1965. Copies to DDC users only.

Descriptors: (*Polycyclic compounds, Photochemistry), (*Molecular isomerism, Polycyclic compounds), (*Cycloalkenes, Molecular isomerism), Stereochemistry, Cyclooctane derivatives, Synthesis (Chemistry), Molecular structure, Nuclear magnetic resonance, Spectra (Infrared)

Irradiation of an ether solution of exo-bicyclo / 3.2.1.0 (2,4)/octene-6 using unfiltered light from a 450 watt Hanovia high pressure mercury lamp

resulted in a 29% yield of tetracyclo/3.3.0.0 (2,8)0 (4,6)/octane. The structure of this hydrocarbon is identical to the hydrocarbon produced by Wolff-Kishner reduction of tetracyclo/3.3.0.0. (2,8)0 (4,6)/octan-3-one as demonstrated by nmr and IR spectral comparison. Irradiation of the endo-isomer under the same conditions produced at 15% yield of the tetracyclic compound. (Author)

AD-627 533 Fld. 7/5
CFSTI Prices: HC $3.00 MF $0.50
NORTHEASTERN UNIV BOSTON MASS PHOTOCHEMISTRY AND SPECTROSCOPY LAB
APPARATUS FOR FLASH PHOTOLYSIS,
by Peter A. Schnieper. Jul 65, 51p. Rept. no. Scientific-3 ,PSL-102
Contract AF19 (628)-3836 Proj. AF-8659 Task 865901 ,865902
AFCRL 65-716

Unclassified report

Descriptors: (*Photolysis, Instrumentation), Circuits, Ruby, Lasers, Methylene blue, Photomultipliers

Flash photolysis provides a means of studying the short-lived chemical intermediates which result from exposure to light. The paper describes the instrumentation for this technique developed at Northeastern University. Details are presented of the main discharge circuit, of the flash tubes, and of the trigger, delay, and detection circuits. A flash photolysis assembly based on the pulsed ruby laser is also described. The photolysis of aqueous methylene blue serves to illustrate the performance of the apparatus. (Author)

AD-628 007 Fld. 7/5, 11/9, 11/10, 11/5
CFSTI Prices: HC $4.00 MF $0.75
DEPARTMENT OF THE NAVY WASHINGTON D C
EFFECT OF IONIZING RADIATION OF POLYMERS,
by T. S. Nikitina, E. V. Zhuravskaya, and A. S. Kuzminskii. 1959, 124p. Rept. no. Translation-774
TT 66-60503

Unclassified report

Trans. of mono. Deistvie Ioniziryushchikh Izluchenii na Polimery, Moscow 1959.

Descriptors: (*Polymers, Radiation damage), (*Plastics, Radiation damage), (*Synthetic rubber, Radiation damage), USSR, Radiation chemistry, Chemical properties, Physical properties, Mechanical properties, Electrical properties, Polyethylene plastics, Styrene plastics, Acrylic resins, Polyvinyl chloride, Halocarbon plastics, Silicone plastics, Fibers (Synthetic), Elastomers

A summary is presented of the material relating to the action of radiation on polymers, published in Soviet and other literature. There is examined generally the regular radiation-chemistry of high polymers, the possible mechanism of action of processes and their peculiarities, and changes of chemical, physical, mechanical, and electrical properties of polymers during irradiation. Results are given of the action of radiation on different classes of polymer materials: plastics (polyethylene, polystyrol, polymethylmethacrylate, polyvinyl chloride, polytetrafluorethylene, and others), natural and synthetic rubbers (carbon-chain, silicon, fluor-, and chlorcontaining), and fibers. The pamphlet is intended for scientific and engineering-technical workers, interested in the possibility of utilizing radiation in the chemistry of high polymers and in changing the properties of polymer materials under the action of ionizing radiation. (Soviet Editor's Note).

AD-627 666 See Fld. 7/2

AD-627 832 See Fld. 7/2

Field 8-EARTH SCIENCES AND OCEANOGRAPHY

8/2. CARTOGRAPHY

AD-627 700 Fld. 8/2, 9/2
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
COUNTING DEVICES IN CARTOGRAPHY,
by A. S. Vasmut, and A. I. Martynenko. Dec 65, 13p. Rept. no. FSTC-381-T65-679
TT 66-60474

Unclassified report

Trans. of Geodeziya i Kartografiya (USSR) n12 p46-52 1964.

Descriptors: (*Mapping, Automation), Counting methods, Automatic, Data processing systems, Plotters, State-of-the-art reviews, USSR

The purpose of the article is to summarize the foreign and Soviet experience of recent years in the development of counting devices, as well as to determine the most rational method for counting a cartographic expression during its reproduction on an automatic device.

AD-627 861 Fld. 8/2
CFSTI Prices: HC $1.00 MF $0.50
AERONAUTICAL CHART AND INFORMATION CENTER ST LOUIS MO LINGUISTIC SECTION
ABOUT THE ACCURACY OF DETERMINING COORDINATES OF FEATURES OF TOPOGRAPHIC MAPS (O TOCHNOSTI OPREDELENIYA KOORDINAT OVEKTOV NA TOPOGRAFICHESKIKH KARTAKH),
by V. V. Ivanov. Feb 66, 8p. Rept. no. TC-987
TT 66-60488

Unclassified report

Trans. of Geodeziya i Kartografiya (USSR) n10 p42-5 1964.

Descriptors: (*Map reading, Position finding), (*Position finding, Map reading), (*Terrain, Maps), Mapping, USSR

AD-627 917 Fld. 8/2, 14/5
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
PHOTOGRAMMETRIC PARAMETERS OF A CAMERA,
by G. V. Romanovskii. Dec 65, 19p. Rept. no. FSTC-381-T65-675
TT 66-60496

Unclassified report

Trans. of mono. Geodeziya i Kartografiya, n. p. Jul 1964 p34-46.

Descriptors: (*Photogrammetry, Cameras), (*Cameras, Photogrammetry), Stereoscopic photography, Photographic scale, Position finding, Steoscopic map plotters, Photographic techniques, USSR

The photogrammetric parameters of a camera are understood to be those constants which must be known in carrying out photogrammetric operations on photographs obtained by using this camera. In this article, the requirements are considered for determining the camera parameters with a view especially toward those methods of stereophotogrammetric photographing which are the most accurate.

AD-627 918 Fld. 8/2
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
ESSENCE OF CARTOGRAPHIC REPRESENTATION AND THE PROSPECTS FOR ITS DEVELOPMENT,
by A. S. Vasmut, and A. B. Rogov. Dec 65, 12p. Rept. no. FSTC-381-T65-678
TT 66-60497

Unclassified report

Trans. of Geodeziya i Kartografiya (USSR) n6 p53-60 Jun 1964.

Descriptors: (*Mapping, State-of-the-art reviews), Maps, Recording systems, USSR

8/3. DYNAMIC OCEANOGRAPHY

AD-627 385 Fld. 8/3
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
PHYSICAL EFFECTS ON THE OCEAN SURFACE,
by W. W. Smith. Dec 65, 17p. Rept. no. NRL-Bib-26

Unclassified report

Descriptors: (*Oceanology, Bibliographies), Oceans, Surface properties, Oceanographic data

This bibliography was originally compiled as an aid to members of the High Resolution Branch, Radar Division in the Surface Effects Program. It is limited to material in which the primary concern is the ocean surface. It is published as a possible aid to others in a similar field of endeavor. (Author)

AD-627 508 Fld. 8/3
CFSTI Prices: HC $2.00 MF $0.50
NAVAL OCEANOGRAPHIC OFFICE WASHINGTON D C
WATER BALANCE OF THE BERING SEA,
by A. K. Leonov. 1965, 33p. Rept. no. Trans-194
TT 66-60450

Unclassified report

Vodnoi Balahs Beringova Morya, trans. of mono. Regionalnaya Okeanografiya, Moscow, 1960 pt1 p79-103.

Descriptors: (*Bering Sea, Hydrology), (*Hydrology, Bering Sea), Pacific Ocean, Arctic Ocean, Ocean currents, Transport properties, Oceanology, USSR

Contents: General characterization of composite currents in the Bering Strait as a basis for the determination of water exchange between the Pacific and Arctic Oceans; Annual variation of water exchange of the Bering Sea through the Bering Strait; Assumed water exchange of the Bering Sea with the Pacific Ocean through Aleutian Straits; A resume of data on the water balance of the Bering Sea; Water masses of the Bering Sea.

AD-627 354 See Fld. 20/4

AD-627 439 See Fld. 20/14

8/5. GEODESY

AD-627 721 Fld. 8/5
CFSTI Prices: HC $5.00 MF $1.00
HOLMAN (JOHN F) CO INC WASHINGTON D C
THE ACCURACY OF CONTINUOUS TRIANGULATION NETWORKS,
by K. L. Provorov. Feb 66, 194p. Contract DA-44-009-AMC-930 (T) Proj. DA-4-A-013-001-A-91-D
AERDL T-1816-66

Unclassified report

Trans. of mono. O Tochnosti Sploshnykh Setei Triangulyatsii, Moscow 1956.

Descriptors: (*Geodesics, USSR), Errors, Astronomical geodesics, Trigonometry

Contents: Accuracy of results of angle measurements in a continuous triangulation network; Errors in determining the lengths of sides and direction angles in a continuous triangulation network consisting of equilateral triangles; Evaluation of the accuracy of elements of a network consisting of triangles of an arbitrary form; Errors in determining the elements of diagonals in a continuous network consisting of equilateral triangles; Experimental studies for investigating the errors in a continuous triangulation network; Influence of the form of the figures on the accuracy of the elements of a continuous network; Accuracy of determination of third- and fourth- order triangulation stations; and Allowance for the influence of errors of initial data.

AD-627 858 Fld. 8/5
CFSTI Prices: HC $1.00 MF $0.50
AERONAUTICAL CHART AND INFORMATION CENTER ST LOUIS MO LINGUISTIC SECTION
REPORT ON THE RESEARCH IN THE FIELD OF GRAVIMETRY, CONDUCTED IN THE SOVIET UNION IN 1962 - 1965,
by Yu. D. Bulanzhe, and L. P. Pellinen. Dec 65, 25p. Rept. no. TC-976
TT 66-60485
Unclassified report

Soobshchenie ob Issledovaniyakh v Oblasti Gravimetrii, Vypolnenykh v SSSR v 1962-1965, trans. of mono. Akademiya Nauk SSSR. Sovetskii Geofizicheskii Komitet, Sektsiya Geodezii, Moscow, 1965 25p.

Descriptors: (*Geodesics, USSR), (*Gravity, Measurement), Instrumentation, Geophysics, State-of-the-art reviews

AD-627 893 Fld. 8/5
CFSTI PricesMF $1.00
NAVAL OCEANOGRAPHIC OFFICE WASHINGTON D C
MATHEMATICAL MODELS FOR NAVIGATION SYSTEMS.
Technical rept.,
by Paul D. Thomas. Oct 65, 151p. Rept. no. TR-182
Proj. HF-103-04-02 Task F31-36-ANB
Unclassified report

Availability: U. S. Naval Oceanographic Office, Washington, D. C., 20390, $2.00.

Descriptors: (*Geodesics, Numerical methods + procedures), (*Loran, Mathematical models), Distance-measuring equipment, Navigational aids

The principal objective of this study was an evaluation of the formulas basic to the geodetic inverse solution for distance computations used by the U. S. Naval Oceanographic Office in loran-type charting. The adequacy of the formulas for past requirements was verified but, in anticipation of future requirements, they were modified to give geodesic distances and azimuths between any two points on the reference ellipsoid to uncertainties of less than a meter and a second respectively. During the study, associated geometrical configurations were developed or studied: latitudes associated with the auxiliary sphere-spheroid configuration; a spherical rectangular coordinate system on the auxiliary sphere with hyperbolic loci referenced to it; and geometrical quantities associated with arc distance, such as chord length, dip of the chord, maximum separation of chord and arc, and the geographical position of the point of maximum separation. The formulas with their derivations are presented. (Author)

8/6. GEOGRAPHY

AD-627 707 Fld. 8/6, 15/7, 8/7
CFSTI Prices: HC $3.00 MF $0.75
ARMY NATICK LABS MASS
PHYSICAL CHARACTERISTICS OF ALLUVIAL FANS.
Technical rept.,
by Robert L. Anstey. Dec 65, 97p. Rept. no. TR-ES-20
Proj. DA-1L013001A91A
Unclassified report

Descriptors: (*Photogeology, Armed forces operations), (*Terrain, Deserts), (*Deserts, Photogeology), Geography, Sedimentation, Pakistan, United States, Map reading, Aerial photographs, Photointerpretation, Trafficability, Armed forces transportation

In this study a new technique is developed for analyzing available world maps and aerial photographs in terms of frequency of occurrence of terrain obstacles as related to capabilities of various types of military vehicles. Employing this technique, an areal quantification of the geometry of alluvial fans was completed for a total of seven 1-degree quadrangles (1 degree Latitude x 1 degree Longitude) of representative desert terrain in the United States and West Pakistan. The greatest development of alluvial fans is associated with mountainous desert regions having wide valleys. Alluvial fans are not related to high mountainous areas or to areas where the mountain mass has been deeply dissected by steep, narrow valleys. Within desert regions it was noted that landform data in one physiographic province were very similar to those in the same type of province (such as a folded-faulted type) and climate elsewhere. Except for similar provinces the agreement was not close. Approximately 70 percent of all alluvial fans studied were 1 to 5 miles miles in length and had total slope gradients of 1 to 5 degrees. Gradients up to 600 feet per mile have been measured on the upper slopes of small alluvial fans. Nearly all alluvial fans have deep washes with vertical walls which may be located near their apices or their aprons. (Author)

AD-627 355 **See Fld. 4/2**

AD-627 386 **See Fld. 4/2**

AD-627 532 **See Fld. 4/2**

8/7. GEOLOGY AND MINERALOGY

AD-627 665 Fld. 8/7
CFSTI Prices: HC $3.00 MF $0.75
DECO ELECTRONICS INC BOULDER COLO
DEEP EARTH CONDUCTIVITY MEASUREMENT TECHNIQUES,
by J. J. Jacobson, and E. L. Maxwell. Jan 66, 66p. Rept. no. 30-P-10
Contract Nonr-3387 (00) Proj. NR-371-590
Unclassified report

Document includes Appendix A, Manual for the Interpretation of Layered Conductivity Curves for the Sequence High-Low-High.

Descriptors: (*Earth (Planet), Electrical conductance), (*Electrical conductance, Earth (Planet)), (*Geophysical prospecting, Electrical conductance), Lithosphere, Electrical properties, Test methods, Instrumentation

Since 1960 DECO Electronics, Inc. has obtained considerable experience in the technique of measuring the electrical conductivity of the earth. This report deals specifically with the four-terminal array methods, their underlying theory and interpretation procedures. Field techniques for concentrated shallow surveys or deep crustal surveys are given. The instrumentation for the shallow surveys consists of commercially available components, whereas the equipment for the deep measurements was designed and built by DECO. The appendix to this report, A Manual for the Interpretation of Layered Conductivity Curves for the Sequency High-Low-High, by Dr. G. V. Keller, discusses in detail many of the problems associated with the real earth in contrast to the idealized earth for which most of the theory has previously been developed. Theoretical curves for several two and three layer cases, effective spacing curves and cross dipole curves are included in the set of curves. (Author)

AD-627 808 Fld. 8/7
CFSTI Prices: HC $1.00 MF $0.50
NAVY UNDERWATER SOUND LAB NEW LONDON CONN
UTILIZING A HORIZONTAL ELECTRIC DIPOLE (HED) TO DETERMINE THE ELECTRICAL PROPERTIES OF A STRATIFIED EARTH.
Research rept.,
by Peter R. Bannister. 24 Jan 66, 23p. Rept. no. USL-715
Proj. SF-106-01-02-10215
Unclassified report

Descriptors: (*Earth (Planet), Electrical properties), (*Geophysial prospecting, Electromagnetic waves), Dipole antennas, Wave transmission, Electromagnetism, Telluric currents, Earth models, Stratigraphy, Geophysics

The fields of a horizontal electric dipole (HED) located over a stratified earth are derived. It is demonstrated that the HED method can be used with the dipole-dipole method to determine the electrical properties of a simple three-layer earth model. Also, a comparison is made among the HED, vertical magnetic dipole (VMD), magnetiotelluric, and audio magneto-telluric methods.

AD-627 840 Fld. 8/7
CFSTI Prices: HC $1.00 MF $0.50
DURHAM UNIV (ENGLAND) DEPT OF GEOLOGY
CRUSTAL STRUCTURE OF GREAT BRITAIN,
by M. H. P. Bott, and A. L. Lucas. 3 Aug 65, 9p. Rept. no. Scientific-4
Contract AF61 (052)-733
AFOSR 65-2929
Unclassified report

Descriptors: (*Geology, Great Britain), (*Great Britain, Structural geology), Seismology, Geophysical prospecting, Instrumentation, Underground explosions

The research aim of this project is the investigation in Great Britain of local variations in crustal structure with particular reference to granite batholiths, and the effects of such variations on the propogation of seismic energy. This investigation is to be carried out by crustal refraction explosion studies. The hardware consists of a ten channel seismometer array with digital magnetic tape recording. The prime consideration during the period of this report has been to get the equipment in the field and operational by September, 1965 in order to take advantage of a series of depth charge explosions in the Irish Sea and St. George's Channel.

AD-627 298 **See Fld. 7/4**

AD-627 299 **See Fld. 7/4**

AD-627 300 **See Fld. 5/1**

AD-627 301 **See Fld. 7/4**

AD-627 616 **See Fld. 8/11**

AD-627 707 **See Fld. 8/6**

AD-627 776 **See Fld. 20/1**

8/8. HYDROLOGY AND LIMNOLOGY

AD-627 264 Fld. 8/8
CFSTI Prices: HC $3.00 MF $0.50
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS
PUBLICATIONS AVAILABLE FOR PURCHASE; U. S. ARMY ENGINEER WATERWAYS EXPERIMENT STATION AND OTHER CORPS OF ENGINEERS AGENCIES)
1 Jan 65, 55p.
Unclassified report

Descriptors: (*Inland waterways, Reports), Hydrology, Engineering, United States Government, Army, Beaches, Erosion, Soils, Concrete, Laboratories, Nuclear weapons

This pamphlet lists publications of the U. S. Army Engineer Waterways Experiment Station and other Corps of Engineers agencies that are available for purchase.

AD-627 883 Fld. 8/8, 8/10
CFSTI Prices: HC $5.00 MF $1.00
LAMONT GEOLOGICAL OBSERVATORY PALISADES N Y
SYMPOSIUM ON DIFFUSION IN OCEANS AND FRESH WATERS, AUGUST 31-SEPTEMBER 2, 1964,
by Takashi Ichiye. Dec 65, 173p.
Unclassified report

Sponsored by AEC and ONR.

Descriptors: (*Diffusion, Oceans), (*Oceanology, Diffusion), (*Hydrology, Diffusion), Lakes, Rivers, Sea water, Transport properties, Symposia

AD-627 354 **See Fld. 20/4**

AD-627 531 **See Fld. 4/2**

8/10. PHYSICAL OCEANOGRAPHY

AD-627 263 Fld. 8/10
CFSTI Prices: HC $1.00 MF $0.50
ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA PA
STUDIES ON THE MARINE QUATERNARY.
Final rept. for 1 Jan-31 Dec 65,
by Horace G. Richards. 15 Jan 66, 13p. Contract Nonr (G)00036-65 Proj. NR-388-071
Unclassified report

Descriptors: (*Marine geology, Paleontology), (*Paleontology, Marine geology), Geologic age determination, Seacoast, Ocean bottom sampling, Well logging, Argentina, Chile, California, Mexico, West Indies

Studies on marine Quarternary shorelines in different parts of the world have been carried on, largely in cooperation with the Lamont Geological Observatory. Cores obtained from the Continental Shelf off Argentina and Chile have yielded fossils indicating a lower sea level. Field work has been done along the Pacific Coast of the United States, as well as near Punta Penasco, Sonora, Mexico, along the Gulf of California. Numerous new localities have been discovered along the Atlantic Coast of the United State and fossile mollusks have been studied. Numerous dates obtained by radiocarbon or ionium are recorded. Limited field work was done in the West Indies, but these studies are not yet complete. (Author)

AD-627 527 Fld. 8/10
CFSTI Prices: HC $3.00 MF $0.75
WOODS HOLE OCEANOGRAPHIC INSTITUTION MASS
TRACK CHARTS, BATHYMETRY, AND LOCATION OF OBSERVATIONS, CHAIN CRUISE NO. 44, NORTH ATLANTIC OCEAN, MID-ATLANTIC RIDGE AND BARRACUDA RIDGE STUDY SEPTEMBER 29, 1964NOVEMBER 16, 1964,
by Tj. H. van Andel, and William M. Dunkle.
Aug 65, 63p. Rept. no. Ref-65-50
Contract Nonr-4029 (00) ,Nonr-2196 (00) Proj. NR-083-004 ,NR-260-101
NYO 2174-38
Unclassified report

Descriptors: (*Oceanology, Atlantic Ocean), (*Atlantic Ocean, Oceanographic data), Hydrographic surveying, Ocean bottom topography, Maps

This report contains charts of Cruise 44 of the CHAIN in the North Atlantic Ocean. There are 40 charts plotted on a Mercator Projection (scale 1 degree Longitude equals 4 inches) showing the track of the entire cruise except for special surveys. All types of observations made during the cruise are noted by suitable symbols or legends along the ship's track. The locations of special surveys are shown on Charts I and II. Charts III, IV, V show special observations made over the Mid-Atlantic Ridge. There are 12 pages showing continuous daily observations, including types of information gathered at each of the stations made. Soundings are read at equal time intervals, usually every five minutes and at each break in slope. They are written along the ship's track as often as space permits. (Author)

AD-627 562 Fld. 8/10
SCRIPPS INSTITUTION OF OCEANOGRAPHY UNIV OF CALIFORNIA LA JOLLA
THE RHONE DEEP-SEA FAN,
by H. W. Menard, S. M. Smith, and R. M. Pratt.
1964, 16p.
Unclassified report

Prepared in cooperation with Woods Hole Oceanographic Institution, Mass.

Availability: Published in The Colston Papers, v17, Proceedings of the Symposium of the Colston Research Society (7th) held in the University of Briston, April 5-9, 1965. Copies to DDC users only.

Descriptors: (*Mediterranean Sea, Ocean bottom topography), (*Marine geology, Mediterranean Sea), France, Rivers, Drainage, Sedimentation, Deltas, Seacoast

The River Rhone has been the major source of sediments making up the Balearic Abyssal Plain and the Rhone Fan, located in the northern end of the western Mediterranean Sea. The fan has an unusual system of large, disrupted, leveed channels possibly formed furing the Pleistocene. The system is superimposed on what appears to be a typical asymmetrical fan, with channels on the left side, produced by the combined effects of gravity and Coriolis force. A band of abyssal hills, 40 by 150 km, runs parallel to the contours in the southeastern quadrant of the fan. Isolated hills are 20-150 m high and 2-6 km across. The hills are tentatively identified as salt domes after examining alternative origins of vulcanism, mud extrusion and anticlinical folding. Area of the fan is 14 x 10000 sq km. and of the abyssal plain 18 x 10000 sq km. The fan is underlain by an average of 10 km of unconsolidated and consolidated sediments. The plain has an average sedimentary thickness of 8 km. Total volume of sediments in the fan and plain is 24 x 100,000 cubic km. Calculations using the present sedimentary load of the River Rhone show that this volume could be produced since the formation of the Alps in Oligocene times with an average post-Eocene rate of source-area denudation of 10 cm/1,000 years. (Author)

AD-627 780 Fld. 8/10, 20/6, 20/13
NAVAL RESEARCH LAB WASHINGTON D C
THE EFFECT OF CONVERGENT AND DIVERGENT FLOW PATTERNS ON INFRARED AND OPTICAL RADIATION FROM THE SEA,
by M. F. M. Osborne. Feb 65, 25p.
Unclassified report

Availability: Published in Sonderdruck aus der Deutschen Hydrographischen Zeitschrift v18 n1 1965. Copies to DDC users only.

Descriptors: (*Oceanology, Thermal radiation), (*Infrared radiation, Oceanology), (*Optical phenomena, Oceanology), Ocean currents, Heat transfer, Marine meteorology

The thermal, and some optical effects, of divergence and convergence are calculated both for steady and periodic in time flow. The former corresponds to stationary sources and sinks or convection cells, the latter to travelling surface and internal waves. Thermal effects are primarily calculated for radiation loss, the effects of evaporation and conduction are estimated. The total thermal effects of surface waves are or order 0.1 to 0.01C, and the frequency spectrum of temperature fluctuations is related quantitatively to the wave height spectrum at the same time and position on the sea. The general thermal effects of an oscillating divergence associated with wave motion can be divided into two parts depending upon whether the period of wave motion is large (slow) or small (rapid) compared to the cooling time of the boundary layer. For rapid variations the temperature variation is independent of boundary layer thickness and is proportional to the static, normal gradient at the surface. This case includes most surface waves. For slow variations, the temperature variation is proportional to the total temperature drop through the boundary layer, and varies with some power of the boundary layer thickness. This case includes most internal waves. For this slow case, the temperature fluctuation is much smaller for a constant boundary layer thickness, than for a layer of thickness varying periodically with the divergence. (Author)

AD-627 793 Fld. 8/10
CFSTI Prices: HC $2.00 MF $0.50
HAWAII INST OF GEOPHYSICS HONOLULU
THE BATHYMETRY OF THE HAWAIIAN ISLANDS. PART I. OAHU,
by George Pararas-Carayannis. Dec 65, 39p.
Rept. no. HIG-65-15
Contract Nonr-3748 (03) Proj. NR-083-168
Unclassified report

Descriptors: (*Marine geology, Hawaii), (*Hawaii, Marine geology), Pacific Ocean, Ocean bottom topography, Maps, Hydrographic surveying

The general purpose and reliability of bathymetric charts are discussed with regard to their usefulness in geological, geophysical, and oceanographical investigations. A short history is given of the bathymetric work around the Hawaiian Islands which has been conducted by the USC and GS and the U. S. Navy Hydrographic Office, and by other miscellaneous agencies, institutions, and individuals since the beginning of the century. All these sources of bathymetric information are listed in table form along with the date the work was completed and the area covered. A short discussion of the nearshore bathymetry of the island of Oahu is given as well as explanations on how the bathymetric charts were compiled, the scales that were used, the geographic datum, the sea level datum, the control of data, the possibility of errors, and the accuracy and reliability of bathymetric charts in general. Finally, a set of 11 photographically reduced charts is included to be used as an index, 10 of which show the nearshore bathymetry of Oahu, and one, the deep ocean bathymetry. (Author)

AD-627 524 **See Fld. 15/1**

AD-627 603 **See Fld. 20/14**

AD-627 604 **See Fld. 20/14**

AD-627 607 **See Fld. 4/1**

AD-627 883 **See Fld. 8/8**

8/11. SEISMOLOGY

AD-627 373 Fld. 8/11, 17/10
CFSTI Prices: HC $2.00 MF $0.50
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF GEOLOGY AND GEOPHYSICS
STUDIES OF THE EFFECT OF DEPTH OF FOCUS ON SEISMIC PULSES.
Annual rept. for 1965,
by B. F. Howell,Jr., and P. M. Lavin. 1965, 42p.
Contract AF19(628)-238 ,ARPA Order-180-61

Unclassified report

Descriptors: (*Seismology, Identification systems), Earthquakes, Nuclear explosions, Epicenters, Depth finding, Seismic waves, Propagation, Detection

The principal objective of this research is to improve the accuracy of focal-depth determination as a means of distinguishing between natural earthquakes and explosions. The research has consisted mainly of evaluating a method of focal-depth determination which depends on recognition of the sequence of events which arise from the reflection of the initial P pulse at the surface, and evaluating the factors controlling the accuracy of this measurement. A second objective is to study the effect of the nature of a boundary on seismic pulses refracted along it both in scale models and in the real earth. (Author)

AD-627 616 Fld. 8/11, 8/7
CFSTI Prices: HC $1.00 MF $0.50
NATIONAL OBSERVATORY OF ATHENS (GREECE) SEISMOLOGICAL INST
AFTERSHOCK SEQUENCE AND CRUSTAL STRUCTURE IN THE REGION OF GREECE.
Annual summary rept. no. 1, 1 Jun 64-31 May 65,
by A. G. Galanopoulos, and Basil C. Papazachos.
31 May 65, 7p. Contract AF61 (052)-803 Proj. AF-8652
AFOSR 65-2938

Unclassified report

Descriptors: (*Seismology, Greece), (*Greece, Seismology), (*Structural geology, Greece), Earthquakes, Seismic waves, Epicenters

The object of this study was to determine the wave velocities of body waves, to attempt to calculate the average thickness of the crust and to have an estimation about the change of the thickness of the crust from place in the region considered. The first problem was to identify the most prominent phase and find their travel time curves. Different procedures were followed to determine the travel time curves for epicentral distances between 0 and 150 km and for epicentral distances between 200 and 1000 km. By using data from 250 earthquakes with epicenters near the station of Athens, the velocities of the direct P and S waves were found to be equal to 5.25 km/sec. and 3.19 km/sec, respectively. The determined mean focal depth of these earthquakes is 7 km. By using data from about 1000 earthquakes with epicenters in the region of Greece the most prominent phases for epicentral distances between 0 and 1000 km were identified. Their travel time curves were also determined.

AD-628 023 Fld. 8/11, 17/10
CFSTI Prices: HC $3.00 MF $0.75
INSTITUTO GEOGRAFICO Y CATASTRAL MADRID (SPAIN)
BACKGROUND NOISE ON THE S. S. S. STANDARD INSTRUMENTS (RUIDO DE FONDO EN LOS SISMOGRAFOS STANDARD DEL SERVICIO DE SISMOLOGIA),
by A. Lopez Arroyo. Jan 64, 62p. Contract AF61 (052)-657
AFOSR 65-2318

Unclassified report

Descriptors: (*Seismology, Spain), Seismological stations, Seismographs, Calibration, Microseisms, Earthquakes, Underground explosions, Noise, Background, Detection

A study of noise observed on the Toledo and Malaga seismographs of the World-wide Standarized Seismograph Network is given. For both sets of instruments, LP and SP, the noise is classified in microseisms and disturbances. The spectrum of LP and SP microseisms is obtained and compared with previous data. A minimum of the amplitude in the neighborhood of 2 cps, already observed at many sites of the USA, is also shown for Toledo and Malaga; whereas the maximum of the spectrum around 4 - 8 sec, established by Brune and Oliver and considered by them as a major result of observational seismology is not clearly defined. Annual variation of microseismic period and amplitude is analyzed and the ratio AH/AZ derived; such ratio is used for computing the thickness of the sedimentary layer at the observatories. Observation shows the existence of a predominant period of microseisms at the two places considered. The data include periods greater than 0.4 sec only, since the instruments are not sensitive enough for recording shorter period microseisms; but they show a clear distinction between the period distribution curves of Toledo and Malaga, which is explained in terms of difference in geologic structure. LP disturbances are correlated with wind and movement of people inside the Observatory. A very near origin (inside the vault, perhaps in the seismometer) is suggested for pulses observed on the three LP components. SP disturbances, on the other hand, are seen to be produced partly by traffic along nearby road. (Author)

8/12. SNOW, ICE, AND PERMAFROST

AD-627 667 Fld. 8/12, 4/2
CFSTI Prices: HC $6.00 MF $1.25
SPACE-GENERAL CORP EL MONTE CALIF
PASSIVE MICROWAVE MEASUREMENTS OF SNOW.
Technical rept. no. 1, 4 Jan-1 Sep 65,
by J. M. Kennedy, R. T. Sakamoto, W. B. Ricketts, J. S. Ross, and R. M. Mandl. 15 Dec 65, 251p. Rept. no. SGC-829R-3
Contract Nonr-4767 (00) Proj. NR-387-033

Unclassified report

Descriptors: (*Microwave frequency, Radiometers), (*Snow, Measurement), (*Radiometers, Microwave frequency), Thermal radiation, Microwaves, Passive, Microwave equipment, Meteorological instruments, Geophysics

A field measurements program, sponsored by the Office of Naval Research, was commenced on 2 May 1965 at Crater Lake, Oregon. The prime purpose of this program was to obtain radiometric data from snow covered ground at 13.5 Gc, 37 Gc, and 94 Gc. The microwave radiometric temperatures were recorded for both horizontal and vertical polarization on flat snow courses with snow depths from 1/2 inch to 180 inches. Various geophysical measurements such as free air temperature, subsurface temperatures, density, free water content, and meterological measurements were also made to determine their relations to passive microwave emmissions. Different microwave frequencies do not behave in the same manner with varying moisture content. This is believed to be due to the frequency dispersive property of water in the microwave region. (Author)

AD-627 678 Fld. 8/12
CFSTI Prices: HC $1.00 MF $0.50
NAVAL OCEANOGRAPHIC OFFICE WASHINGTON D C
VARIABILITY OF ICE CONDITIONS IN NORTHWESTERN ATLANTIC,
by A. A. Lebedev. 1965, 11p. Rept. no. Trans-261
TT 66-60467

Unclassified report

Izmenchivost Ledovykh Uslovii N Severo-Zapadnoi Atlantike, trans. of mono. Materialy Sessi Uchenogo Soveta 'Pinro' po Rezultatam Issledovanii v, Murmansk, 1964 p123-9.

Descriptors: (*Ice islands, Atlantic Ocean), (*Atlantic Ocean, Ice islands), Arctic regions, Greenland, Newfoundland (Province), Ice, Mathematical prediction, USSR

Forecasting the position of the ice edge for the Labrador Sea and Davis Strait in various seasons of the year is discussed. The study is based on data on the position of the ice edge obtained during many years of systematic observations. The frequency of occurrence in given locations, expectancy, of forecasts and the range of accuracy are tabulated and defined by mathematical formulae. (Author)

AD-627 984 Fld. 8/12
CFSTI Prices: HC $2.00 MF $0.50
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
MIGRATION OF BUBBLES IN ICE UNDER A TEMPERATURE GRADIENT.
Technical rept., Nov 64-Jun 65,
by N. S. Stehle. Dec 65, 36p. Rept. no. TR-R-421
Proj. Y-F015-11-01-052

Unclassified report

Descriptors: (*Bubbles, Ice), (*Ice, Permeability), Salinity, Glaciers, Transport properties

With the purpose of obtaining insight into the mechanisms of brine migration in polar ice, a laboratory investigation of the migration velocity of air bubbles and vapor figures in fresh-water ice was made (1) to test the migration of fluid inclusions under a temperature gradient, (2) to verify Nakaya's investigations of the migration of vapor figures under a temperature gradient, and (3) to study the physical characteristics of bubbles in ice under a temperature gradient. The migration velocities of vapor figures measured in this investigation agreed with those of Nakaya, but his theoretical formula for the migration velocities of vapor figures had to be modified to take into account the effect of internal air pressure and figure shape. The observed velocities of vapor figures and air bubbles supported the theoretical calculations. It was determined that bubble shape, which changed during migration, and the air pressure in bubble, which varied among bubbles, together with temperature markedly affected the velocity. In addition to changing shape during migration, the bubbles gradually filled with frost. The effect of frost on the velocity and the reason for its formation could not be completely explained. Similar experiments should be conducted with sea ice to determine the velocity of migration of brine pockets and the mechanisms limiting velocity. (Author)

AD-627 985 **See Fld. 4/2**

8/13. SOIL MECHANICS

AD-627 895 Fld. 8/13
CFSTI Prices: HC $7.00 MF $1.50
ILLINOIS UNIV URBANA DEPT OF CIVIL ENGINEERING
STATIC AND DYNAMIC BEHAVIOR OF SANDS IN ONE-DIMENSIONAL COMPRESSION.
Rept. for Feb 64-Aug 65,
by M. T. Davisson, T. R. Maynard, and V. G. Koike. Dec 65, 326p. Contract AF29 (601)-6369 Proj. AF-5710
AFWL TR-65-29

Unclassified report

Descriptors: (*Sand, Compressive properties), (*Compressive properties, Sand), Soil

mechanics, Loading (Mechanics), Tests, Test methods, Experimental data, Minnesota, Pennsylvania, Stresses

Static, rapid and dynamic one-dimensional compression tests were performed on four different sands at each of three different initial relative densities. The maximum stresses attained were generally 10,000 psi or higher, except for a low-pressure dynamic test series which attained stresses from 1,000 to 1,500 psi. The results of the tests are presented in the form of plots of axial stress versus axial strain, constrained modulus versus axial stress, and radial stress versus axial stress; grain size distribution curves are also presented for each specimen for both the before- and after-test conditions. The static data were compared to Hendron's static data or the same four sands; general agreement was noted, although the compressibility was consistently somewhat higher than observed by Hendron. The radial stresses were also somewhat lower; however, the discrepancies are probably a function of the test devices and the manner of performing the test. Crushing of the sand grains was very pronounced for the coarse sands, especially the angular sand, and had an overwhelming effect on the stress-strain relationship. Consideration of sand-grain contact stresses provides a qualitative explanation for the observed behavior.

AD-627 377 **See Fld. 1/2**

AD-627 692 **See Fld. 13/13**

8/14. TERRESTRIAL MAGNETISM

AD-627 416 **See Fld. 4/1**

AD-627 824 **See Fld. 20/3**

Field 9-ELECTRONICS AND ELECTRICAL ENGINEERING

9/1. COMPONENTS

AD-627 321 Fld. 9/1
CFSTI Prices: HC $2.00 MF $0.50
LINDE DIV UNION CARBIDE CORP GREENVILLE S C
RESEARCH AND DEVELOPMENT WORK ON DEVELOPMENT OF THIN ORGANIC ROLLED FILM CAPACITOR.
Quarterly progress rept. no. 7, 1 Aug-31 Oct 65, by J. R. Hutzler. 31 Oct 65, 34p. Contract NObsr-89519
Unclassified report

See also AD-623 905.

Descriptors: (*Capacitors, Dielectric films), (*Dielectric films, Capacitors), Foils, Plastic films, Phenolic plastics, Impregnation, Capacitance, Flame spraying, Metal coatings, Manufacturing methods

Progress is reported on a program to improve the characteristics of parylene coated foil capacitor by investigating and improving the various processes involved in manufacturing the capacitor. To develop a metallized parylene capacitor capable of operating over the temperature range of -55C to 125C at a rated voltage of 100 VDC, whose capacitance volume ratio is one-half that of a 50 volt metallized Mylar capaçitor. Such capacitor to exhibit a dissipation factor less than 0.25%; 250 megohm microfarad minimum insulation resistance at 125C; temperature coefficient less than 300 ppm/C; 200% dielectric voltage withstand; less than 5% change in capacitance after life. (Author)

AD-627 331 Fld. 9/1
CFSTI Prices: HC $1.00 MF $0.50
CTS KNIGHTS INC SANDWICH ILL
PRODUCTION ENGINEERING MEASURES. VHF QUARTZ CRYSTAL UNITS CR- (XM-38)/U 150 MC TO 200 MC. SPECIFICATION SCS-75.
Quarterly rept. no. 10, 1 Jul-30 Sep 65. 30 Sep 65, 17p. Contract DA-36-039-SC-85973
Unclassified report

See also AD-622 561.

Descriptors: (*Crystal oscillators, Quartz), (*Quartz, Crystal oscillators), Very high frequency, Ultrahigh frequency, Gold, Aluminum, Plating, Capacitance, Inductance, Transmission lines, Resistance (Electrical), Processing, Manufacturing methods

A statistical analysis of the resistances of 150 mc, 162 mc, 174 mc, and 200 mc units, before and after final frequency adjustment with evaporated gold, is given. The plating head used for final plating thirty units with one pump-down of an ion pump vacuum system is described. The open transmission line used for connecting the plating head to the impedance meter is described. (Author)

AD-627 334 Fld. 9/1
CFSTI Prices: HC $2.00 MF $0.50
SILICONIX INC SUNNYVALE CALIF
TRANSISTOR, FIELD EFFECT, INSULATED GATE, 100 MC AMPLIFIER.
Final rept. 1 Dec 64-1 Jun 65, by Gerald L. Parker. 1 Jun 65, 33p. Contract DA-28-043-AMC-00436 (E) Proj. NR-1P6-22001-A-056 Task 1P622001A05601
Unclassified report

Descriptors: (*Transistor amplifiers, Very high frequency), Performance (Engineering), Transistors, Radiofrequency power, Silicon compounds, Oxides, Aluminum, Resistance (Electrical), Electrical impedance, Processing

Three N-channel depletion-mode MOS transistors for use in a 100 mc amplifier were designed, manufactured, and tested. The first two devices, MOS I and MOS II, were designed to study high-frequency characteristics. MOS I had substantially higher transconductance than MOS II and hence more power gain. The best neutralized power gain of MOS I was 14.5 db, limited by low transconductance and high input conductance. MOS III resulted from design changes in MOS I. Neutralized power gain was increased to 19 db with a transconductance of about 2000 micro mhos. The C sub dg was 0.2 pf (essentially the pin capacitance of the TO-18 package), C sub gs 3 pf, and C sub ds 1.5 pf. Devices designed under the contract were minimum geometry designs to maximize the g sub fs/C ratios. Because of this, the power gain is lower than the 20 db goal set by the contract. It is concluded from this work that the capacitance must be increased slightly to increase the transconductance necessary to guarantee a 20 db power gain. (Author)

AD-627 374 Fld. 9/1, 12/1
CFSTI Prices: HC $3.00 MF $0.75
SYSTEMS ENGINEERING LAB UNIV OF MICHIGAN ANN ARBOR
ERRORS IN FINITE AUTOMATA.
Technical rept., by Philip S. Dauber. Oct 65, 79p. Rept. no. SEL-65-1 ,06920-5-T Contract AF30 (602)-3546
Unclassified report

Descriptors: (*Automata, Errors), Computers, Reliability (Electronics), Corrections, Programming (Computers), Networks, Groups (Mathematics), Probability

The correctability properties of errors is studied in a finite automaton driven by a random source. An error is defined to be a pair of states and is corrected by a tape if the tape takes both coordinates of the pair into the same state. Errors are classified as one of four types: correctable, finite, definite, and non-correctable. A correctable error is an error for which there is a correcting tape. The error is finite if the probability of the set of correcting tapes approaches one as the length of the tapes gets longer. A definite error is an error for which all tapes, of length greater than some fixed length, are correcting tapes. A non-correctable error is one for which there does not exist a correcting tape. The set of finite errors induces a partition, called the finite error partition, on the set of states. The notation of the semigroup of the automaton is introduced. Necessary and sufficient conditions are given for the automaton to have errors which are correctable but not finite and for the automaton to have only definite or non-correctable errors. The error properties are given for finite automata which have a large number of states but can be decomposed into a series, parallel connection of smaller automata. (Author)

AD-627 413 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
CTS CORP ELKHART IND RESEARCH AND DEVELOPMENT DIV
PRODUCTION ENGINEERING MEASURE FOR SUBMINIATURE, TRANSISTOR TYPE POTENTIOMETERS.
Quarterly progress rept. no. 16, 1 Apr-30 Jun 65, by C. L. Holmes, and D. C. Kinsey. 30 Jun 65, 12p. Contract DA-36-039-SC-85976E
Unclassified report

See also AD-621 355.

Descriptors: (*Potentiometers, Manufacturing methods), (*Subminiature electronic equipment, Potentiometers), Transistors, Reliability (Electronics), Performance (Engineering), Life expectancy, Tests

1,800 samples were fabricated and tested to Technical Requirement SCS-112. These units did not satisfactorily perform all of the specified requirements. 1,600 controls were refabricated and retested in an attempt to meet those test requirements which were not met on the first 1,800 group. After completion of the second test group, test specifications of Technical Requirement SCS-112 had still not been satisfactorily met on moisture resistance testing on the 50 ohm controls of both styles and rotational life testing on the 25,000 ohm bushing mount style. Because these two test requirements are beyond the present state of the art, Technical Action Request No. 8 was submitted to request a change in test requirements. These requested changes were denied. These requests were then submitted to the contracting officer for judgment. (Author)

AD-627 530 Fld. 9/1, 20/9
CFSTI Prices: HC $2.00 MF $0.50
CHALMERS UNIV OF TECHNOLOGY GOTEBORG (SWEDEN) RESEARCH LAB OF ELECTRONICS
NONLINEAR ANALYSIS OF A MICROWAVE BEAM-PLASMA AMPLIFIER.
Technical note, by Bo Geidne. 1 Aug 65. 45p. Rept. No. T N-6, RR-52
Contract AF61 (052)-594
RADC TR-66-28
Unclassified report

Descriptors: (*Plasma physics, Microwave amplifiers), (*Microwave amplifiers, Plasma physics), (*Electron beams, Microwave amplifiers), (*Beam power tubes, Plasma physics), Space charges, Electromagnetic waves, Equations of motion, Linear systems, Nonlinear systems

This paper deals with the linear and nonlinear field theory of an idealized, radially finite beam-plasma amplifier model. Both the beam and the plasma are assumed to be made up of infinitesimal, rigid, circular discs with a charge to mass ratio equal to that of the electron. Radial motions and finite temperature effects are not considered. Thus the main

purpose of the theory, which is purely analytical, is to describe as simply as possible the effect of finite radial boundaries upon the basic linear and nonlinear properties of beam-plasma devices. Linear amplification and bandwidth, non-linear generation of second and third harmonic signals and distortion of the fundamental are studied. (Author)

AD-627 534 Fld. 9/1, 13/8
CFSTI Prices: HC $2.00 MF $0.50
BOMAC DIV VARIAN ASSOCIATES BEVERLY MASS
PRODUCTION ENGINEERING MEASURE FOR LOW FIELD MAGNETRON BL-234C.
Quarterly progress rept. no. 2, 28 Jul-28 Oct 65, by Arnold M. Eklund. 28 Oct 65, 48p. Contract DA-36-039-AMC-06162 (E)

Unclassified report

Descriptors: (*Magnetrons, Manufacturing methods), Cathodes (Electron tubes), Performance (Engineering), Machining, Anodes (Electron tubes), Radiofrequency power, Nickel, Tungsten

The cathode investigation was focused on two major cathode types; the presently used nickel matrix cathode and the longer life 'S' type tungsten dispenser cathode. Tube 6S, which contains the Semicon nickel matrix cathode, delivered 900 peak watts of power with low jitter and 350 volt mode width. Tube 7S, containing the standard Bomac nickel matrix cathode, produced 600 watts with a 550 volt mode width and low jitter. The exceedingly good performance of these two tubes is essentially attributed to a change in cathode activation procedure. A tube has been processed to include a directly heated tungsten dispenser cathode. Although problems were encountered with erratic heater operation during hot test, the heater power requirement of these cathodes is only 1/6th of that of the present indirectly heated design. Finish machining a hot hobbed anode was achieved by potting the anode in a plastic compound, rough machining the anode end cavities with an end mill, finishing with a carbide boring bar, and broaching the anode hole with a modified broach. It has been determined that subjecting the potted anode to vibration hardens the copper and permits an improved anode finish as well as a reduction in the size of burrs produced by conventional machining. Work hardening by temperature cycling was also investigated, but no indication of copper hardening was observed.

AD-627 601 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
VARIAN ASSOCIATES BEVERLY MASS
THALLIUM BEAM TUBE RESEARCH.
Quarterly progress rept. no. 5, 1 Aug-31 Oct 65, by Richard F. Lacey. Jan 66, 17p. Contract DA-28-043-AMC-00350 (E) Proj. DA-1P6-2200-1A-058 Task 1P6-2200-1A-058-03

Unclassified report

Descriptors: (*Thallium, Beam power tubes), (*Beam power tubes, Thallium), Molecular beams, Ionization, Cavity resonators, Electron optics, Atomic clocks, Frequency, Standards, Iridium, Work functions, Magnets

Measurement of the work function of iridium made by the variation of thallium ion current with temperature of the iridium ionizer resulted in a value of 5.53 plus or minus .03 eV, compared to 5.40 found for thermionic electron emission. A modification of a previous design for a quadrupole magnet with alnico drivers led to an increase of the field at the pole tips from 6.6 kG to 7.3 kG. This value is still less than the approximately 10 kG obtained by electrically driven quadrupole magnets of similar aperture. (Author)

AD-627 636 Fld. 9/1
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AVIONICS FACILITY INDIANAPOLIS IND
MINIMAL AREA THIN-FILM R-C CIRCUITS.
Interim technical rept.,
by John G. Bennett. 29 Nov 65, 12p. Rept. NAFI-TR-718

Unclassified report

Descriptors: (*Films, Circuits), (*Circuits, Films), Resistance (Electrical), Capacitance, Mathematical analysis

The problem of finding the minimal area thin-film R-C circuit with a particular time constant is analyzed with elementary calculus with the conclusion that the circuit has minimal area when the area used by the resistor is equal to the area used by the capacitor, regardless of the resistance of capacitance per unit area. (Author)

AD-627 738 Fld. 9/1
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS
THE TIME-VARIABLE TRANSFORMER,
by B. D. Anderson, D. A. Spaulding, and R. W. Newcomb. 1 Apr 65, 3p. Contract AF-AFOSR-337-63
AFOSR 65-2358

Unclassified report

Availability: Published in IEEE Proceedings v53 n6 p634-5 Jun 1965. Copies to DDC users only.

Descriptors: (*Transformers, Networks), Topology, Circuits, Synthesis

Uses and realizations of the ideal time-variable transformer are pointed out. Although physical realizations must of necessity only be approximate, the uses in modeling and synthesis of time-variable systems make it an object for consideration in its own right.

AD-627 739 Fld. 9/1
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS
ON RELATIONS BETWEEN SERIES- AND SHUNT-AUGMENTED NETWORKS,
by B. D. Anderson, and R. W. Newcomb. 12 May 65, 2p. Contract AF-AFOSR-337-63
AFOSR 65-2422

Unclassified report

Availability: Published in IEEE Proceedings v53 n7 p725 Jul 1965. Copies to DDC users only.

Descriptors: (*Electrical networks, Matrix algebra), Electrical impedance, Admittance, S-matrix

The shunt-augmented impedance matrix for a linear time-varying network was introduced. The existence of this matrix guarantees and is guaranteed by the existence of the augmented network admittance matrix, or the scattering matrix. Further these three matrices are related in a simple fashion.

AD-627 740 Fld. 9/1, 12/1
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS
THE TIME-VARIABLE SCATTERING MATRIX,
by D. A. Spaulding, and R. W. Newcomb. 31 Mar 65, 3p. Contract AF-AFOSR-337-63
AFOSR 65-2359

Unclassified report

Availability: Published in IEEE Proceedings v53 n6 p651-2 Jun 1965. Copies to DDC users only.

Descriptors: (*Electrical networks, Matrix algebra), (*Matrix algebra, Electrical networks), Scattering, Time, Wave transmission

A theorem is presented which states the conditions under which a time-variable scattering matrix exists, showing that it satisfies an antecedance (causality) restriction. Because of its importance, the lossless condition has also been stated. The statements have been worded in terms of network theory, but because of the importance of general scattering systems, the results should be of use in other disciplines.

AD-627 741 Fld. 9/1
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS
ON THE DEFINITION OF A NETWORK,
by R. W. Newcomb. 5 Mar 65, 2p. Contract AF-AFOSR-337-63
AFOSR 65-2360

Unclassified report

Availability: Published in IEEE Proceedings v53 n5 p547-8 May 1965. Copies to DDC users only.

Descriptors: (*Electrical networks, Set theory), Electric currents, Voltage

AD-627 782 Fld. 9/1, 12/2
MASSACHUSETTS INST OF TECH CAMBRIDGE
THE TWO SIDES OF TIME-SHARING.
by Martin Greenberger. 1965, 4p. Contract Nonr-4102 (01)

Unclassified report

Availability: Published in Datamation Magazine Nov 1965. Copies to DDC users only.

Descriptors: (*Computers, Scheduling), (*Scheduling, Computers), Queueing theory, Input-output devices, Data processing systems, Operators (Mathematics)

AD-627 823 Fld. 9/1, 11/8
CFSTI Prices: HC $2.00 MF $0.50
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV
PRODUCTION ENGINEERING MEASURE FOR SILICON NPN SWITCHING TRANSISTORS.
Quarterly progress rept. no. 1, 15 May-25 Aug 65,
by Thomas Kearkuff, and Jack Freese. 25 Aug 65, 35p. Contract DA-36-039-AMC-06164 (E) Proj. DA-26072

Unclassified report

Descriptors: (*Transistors, Manufacturing methods), (*Electronic switches, Transistors), Silicon, Processing, Doping, Etching, Fixed contacts, Bonding, Packaging, Assembling, Reliability (Electronics), Qualily control, Tests, Tables

The main areas of progress during the first quarter were as follows: (1) Developing the PERT chart. (2) Modifying existing Production Specifications in such a way as to allow the processing of this small geometrytype transistor. (3) Processing test runs through the diffusion, photoresist and metallization areas. (4) Evaluating wafers after the diffusion and metallization process. (5) Starting preliminary work on the assembly modifications. (6) Evaluating completed transistors to the existing electrical specifications. (Author)

AD-627 849 Fld. 9/1, 13/8
CFSTI Prices: HC $3.00 MF $0.75
TEXAS INSTRUMENTS INC DALLAS SEMICONDUCTOR-COMPONENTS DIV
THIN FILMS FORMED BY ELECTROCHEMICAL REACTIONS.
Quarterly progress rept. no. 7, 1 Jun-31 Aug 65, by R. Scot Clark, and Mike Gaze. Oct 65, 61p. Rept. no. TI-03-65-112
Contract DA-36-039-AMC-02324 (E) Proj. DA-ICO-24401-A112-04

Unclassified report

See also AD-615 808.

Descriptors: (*Integrated circuits, Preparation), (*Films, Sputtering), (*Sputtering, Integrated circuits), (*Tantalum compounds, Sputtering), Oxides, Silicon, Resistance (Electrical), Resistors, Capacitors, Dielectric films, Electric connectors, Electrochemistry, Aluminum, Vapor plating, Microminiaturization (Electronics)

Basic investigations in the residual gas contamination during sputtering and oxidation mechanism have yielded information that contributes to increased process control. Also, the oxidation experiments depict a structure that can be modified to aid in temperature coefficient of resistance control. A process control investigation for fabricating 1000 ohms/sq resistors and >0.35 pF/sq mil capacitors on the same silicon substrate has been completed. The results show the yield for the 1000 ohms/sq plus or minus 20% tolerance resistive film is 62% and for both the resistive and capactive films, the yield is 38%. An etch problem on the 455 KHz amplifier has delayed fabrication of this circuit. The problem has been solved by using a KMER mask to deposit the Ta2O5 dielectric through. (Author)

AD-627 850 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
TEXAS INSTRUMENTS INC DALLAS SEMICONDUCTOR-COMPONENTS DIV
SUPPLEMENT TO REPORT NO. 03-65-112,
by R. Scot Clark. Oct 65, 9p. Contract DA-36-039-AMC-02324 (E)

Unclassified report

See also AD-627 849.

Descriptors: (*Integrated circuits, Manufacturing methods), (*Films, Sputtering), (*Sputtering, Integrated circuits), (*Tantalum compounds, Sputtering), Oxides, Gold, Doping, Management planning

AD-627 912 Fld. 9/1, 9/3
CFSTI Prices: HC $2.00 MF $0.50
ZENITH RADIO RESEARCH CORP MENLO PARK CALIF
TRANSVERSE-WAVE HIGH-POWER TUBE.
Quarterly rept. no. 2, 1 Jul-30 Sep 65,
by C. Burton Crumly, and Roy A. Larsen. Jan 66, 33p. Contract DA-28-043-AMC-01268 (E) Proj. DA-1P6-22001-A-005 Task 1P6-22001-A-005-04
ECOM 01268-2

Unclassified report

See also AD-622 574.

Descriptors: (*Traveling-wave tubes, Power amplifiers), (*Power amplifiers, Traveling-wave tubes), (*Electron optics, Traveling-wave tubes), (*Waveguides, Traveling-wave tubes), Electron beams, Electron guns, Design, Cyclotron waves, Broadband, S-band, Impedance matching, Transmission lines, Electron tube parts, Feasibility studies

Research and development work is continuing on a novel type of traveling-wave power amplifier tube, employing transverse-wave interaction between the negative synchronous wave and a circuit wave on a balanced structure. Tests made on the 5-times-scale model revealed that it would be necessary to modify the circuit design in order to decrease the lower cutoff frequency. Tests on a 1:1 model have shown that a potentially broadband circuit which will have an insertion loss of 1.5 to 2.0 db can be fabricated. However, broadband matching to the circuit has not been achieved. A convergent gun has been received, and magnetic field studies were conducted in order to determine the proper positioning of the required magnetic shield. A second cold-test circuit was fabricated and work has begun on techniques to match to the highly dispersive circuit. Design work is continuing with the objective of demonstrating the feasibility of a 1-kw cw output power at an efficiency of at least 60%, using a depressed collector.

AD-627 991 Fld. 9/1, 20/6
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
NEW US-01 LIGHT AMPLIFIER.
5 Nov 65, 5p. Rept. no. FTD-TT-65-708
TT 66-60498

Unclassified report

Unedited rough draft trans. of Tekhnika Molodexhi (USSR) v32 n11 p22 1964.

Descriptors: (*Photomultipliers, Image intensifiers (Electronics)), (*Light, Amplifiers), Photocathodes, Electrooptics, Viewing screens, USSR

The intensification of light is accomplished by projecting the image through the objective onto the photocathode of the electron-optical converter of the instrument. Under the action of very feeble light the photocathode radiates electrons. Passing to the anode they, with the aid of an electron-magnetic lens are focused onto a luminescent screen. The illumination of the image is amplified. Afterward it falls on the photocathode of the following chamber and occurs several times until the required brightness is attained.

AD-628 042 Fld. 9/1
CFSTI Prices: HC $1.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH NJ
DESIGN OF A HIGH VOLTAGE BREAKDOWN IN VACUUM EXPERIMENT.
Technical rept.,
by M. M. Chrepta, J. Weinstein, G. W. Taylor, and M. H. Zinn. Jan 66, 16p. Rept. no. ECOM-2655
Contract ARPA Order-517 Task AMC-7900.21.243.40.00

Unclassified report

Descriptors: (*Avalanche diodes, Design), Electric discharges, Vacuum, Voltage, Dielectric properties, Factor analysis

Although investigators during the past decade have contributed voluminous literature on the mechanism of voltage breakdown in vacuum, there are insufficient data available to permit a straightforward approach to the design of high-voltage sections of high-power electron tubes. It is concluded that there are at least sixteen variables affecting breakdown. Traditional methods of experimenting by varying one parameter at a time would take years to amass the data on which a cohesive theory could be formulated. A pilot experiment was set up based on the statistical approach to experimental design to evaluate the relative importance of each of the variables. The pilot experiment is a partial replicate of a two-level, full factorial design. It is expected that sufficient information will be collected to permit the elimination of variables having minor effects and to permit a more comprehensive design for the final experiment. (Author)

AD-627 383 See Fld. 17/1

AD-627 426 See Fld. 20/6

AD-627 432 See Fld. 13/10

AD-627 469 See Fld. 9/5

AD-627 521 See Fld. 9/5

AD-627 522 See Fld. 9/5

AD-627 528 See Fld. 17/9

AD-627 605 See Fld. 18/8

AD-627 797 See Fld. 9/2

AD-627 866 See Fld. 9/3

AD-627 932 See Fld. 17/9

AD-627 965 See Fld. 9/5

9/2. COMPUTERS

AD-627 306 Fld. 9/2, 3/3
CFSTI Prices: HC $2.00 MF $0.50
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH MATHEMATICS RESEARCH LAB
THE SYMBOLIC MANIPULATION OF POISSON SERIES,
by J. M. A. Danby, Andre Deprit, and A. R. M. Rom. Oct 65, 37p. Rept. no. D1-82-0481 ,Mathematical Note-432

Unclassified report

Also available from the author.

Descriptors: (*Series, Programming (Computers)), (*Celestial mechanics, Programming (Computers)), Algebra, Compilers, Programming languages

Poisson series of three variables are manageable symbolically through a set of formal subroutines written partially in the IBM 7094 machine language, but to be called in the FORTRAN language for use in FORTRAN programs. An effort has been made to supply those operations which are most required by Celestial Mechanics. The routines are entirely self-contained subroutines and require only standard FORTRAN input -output units 5 and 6; they are designed to avoid waste and overflow of core storage space. (Author)

AD-627 335 Fld. 9/2
CFSTI Prices: HC $2.00 MF $0.50
STANFORD RESEARCH INST MENLO PARK CALIF
GRAPHICAL-DATA-PROCESSING RESEARCH STUDY AND EXPERIMENTAL INVESTIGATION.
Quarterly progress rept. no. 9, 1 Aug-31 Oct 65,
by Alfred E. Brain, Richard O. Duda, George E. Forsen, and John H. Munson. Nov 65, 39p. Rept. no. SR1-R-21
Contract DA-36-039-AMC-03247 (E) Proj. DA-1P0-20401-A-327 ,SR1-4565 Task 1P0-20401-A-327-02-1

Unclassified report

See also AD-623 280.

Descriptors: (*Graphics, Data processing systems), (*Information retrieval, Graphics), (*Pattern recognition, Graphics), (*Data processing systems, Military requirements), Digital computers, Computer logic, Training, Maps, Television communication systems, Television display systems, Pictures

The experiments on the recognition of hand-drawn military map symbols, using the edge-detector mask plate in the 1000-image preprocessor, have been continued with each image being displayed in a series of 9 positions, plus a 10th view with the image somewhat larger. This gave a data set of 4050 patterns; 3240 were used for training, 810 for testing. The error rate was relatively higher for the training data as compared with previously reported results, but relatively lower for the test data. The piecewise linear structure performed significantly better than the committee machine. A brief account is given of the method used to display the characteristics of the Dot Product Units in MINOS II. The shift-register interface between the TV camera and the SDS 910 has now been completed and is operational. Illustrations are shown of the normal picture, quantized picture, 120-line stored picture, and 24-line stored picture for the map symbols used in the tests described. (Author)

AD-627 399 Fld. 9/2, 22/3, 20/14
CFSTI Prices: HC $4.00 MF $0.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
A COMPUTING PROGRAM FOR THE DOPPLER TRACKING OF SILENT SATELLITES,
by William H. Guier, and B. J. Hook. 20 Oct 58, 123p. Rept. no. TG-321
Contract NOrd-7386

Unclassified report

Descriptors: (*Programming (Computers), Tracking), (*Doppler effect, Tracking), (*Scientific satellites, Tracking), Orbital trajectories, Ionospheric propagation, Satellite tracking systems

The purpose of the computing program is to use a single Doppler curve to estimate a rough orbit of a silent satellite for purposes of identification and prediction. This report contains the assumptions, theoretical equations, code, and preliminary tracking results of this initial computing program. To test the program, two sets of Doppler data, taken during two different passes of Explorer IV, were used to predict the Explorer IV orbit, and the resulting predicted orbits were compared with other orbit determinations. It was found that about forty minutes of computing time on the Univac 1103A were required to determine a predicted orbit from one set of Doppler data. The error in the predicted satellite position was found to range from less than twenty miles for an overhead pass to about 100 miles for a more distant pass. It is shown that this error is due mainly to the neglect of ionospheric refraction and second order force terms in the theoretical expression for the Doppler shift, factors which were neglected because of the requirement of keeping computing time to a minimum. Suggestions are made for future re-coding of the program which should materially reduce the tracking error without increasing the computing time. (Author)

AD-627 412 Fld. 9/2
CFSTI Prices: HC $3.00 MF $0.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
MINOTAUR, A RELAY COMPUTER,
by George J. Vasilakos. Feb 60, 61p. Rept. no. TG-360
Contract NOrd-7386

Unclassified report

Descriptors: (*Digital computers, Relays), Computer logic, Aritificial intelligence, Conditioned reflex, Simulation

The Minotaur was designed as an all-purpose demonstration digital computer. It has limited storage capacity, plugged program operation, and simple input-output facilities. The basic components of Minotaur are ordinary four-pole electromechanical relays. These are used for information storage, and as the basic operational units in the design of plugged program circuits. The Minotaur is not a logically assembled array of parts designed to operate in a prescribed fashion, according to a fixed repertoire of instructions. In Minotaur the programmer has at his disposal relays and auxiliary equipment which he must organize to perform the steps of the program. In particular, the adders, accumulators, or any registers must be designed and programmed for individual problems. The manual presents the operation and description of the Minotaur. The manual is divided into sections, each describing the machine's operation or some functional application. For each section describing a program, the manual gives an explanation of the problem with at least one illustration of the program. Sample programs are usually shown using logical block diagrams rather than in terms of actual machine components.

AD-627 419 Fld. 9/2
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
DATA PROCESSING CENTER,
by J. P. Randolph. Mar 60, 45p. Rept. no. TG-363
Contract NOrd-7386

Unclassified report

Descriptors: (*Data processing systems, Telemetering data), (*Telemetering data, Data processing systems), Analog computers, Guided missiles, Computers, Vibration, Digital systems, Telemeter systems, Demodulation

The Applied Physics Laboratory Data Processing Center described, with particular emphasis on the Data Processing Facility. The Center is capable of accepting inputs and providing outputs in any of the following forms: Magnetic tape of five types: 0.5-inch, 4-track analog, 0.5-inch, 7-track analog, 1.0-inch, 16-track digital, 0.5-inch, 8-track 1103A digital, 0.5-inch, 7-track IBM digital; graphical records; film data; punched cards; punched paper tape; tabular listing. The operations which can be performed on these data include the following: demodulation and recording of four types of telemetry data: FM/FM, PAM/FM/FM, PDM/FM/FM, PCM/FM; analog computing; digitization; digital computing; vibration analysis; automatic plotting; data conversion from any of the input forms listed to any other form listed. (Author)

AD-627 422 Fld. 9/2, 9/6
CFSTI Prices: HC $1.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
TELEMETRY DATA REDUCTION FACILITY, DESIGN TECHNIQUES,
by Edwin E. Westerfield. Apr 61, 23p. Rept. no. TG-398
Contract NOrd-7386

Unclassified report

Descriptors: (*Data processing systems, Telemetering data), (*Telemetering data, Data processing systems), Magnetic tape, Magnetic recording systems, Remote control systems, Command + control systems, Automatic, Calibration, Power supplies, Computers, Systems engineering, Weapon systems

The Applied Physics Laboratory has recently completed construction of a Data Processing Facility to provide for processing, for the Bureau of Naval Weapons, a wide variety of types of telemetry and systems data from several weapon system programs, recorded on magnetic tape. This report briefly describes some of the special devices with which this new facility is equipped to increase its flexibility and efficiency. Among them are a tape recorder control patching system, and a station control unit which permits operators of individual stations a broad control of separate-station, interstation, area, and remotelocation functions. The facility utilizes 58 discriminators located in various stations, for which an automatic calibration system has been constructed to perform a detailed daily check of the linearity of each discriminator. The complete system uses approximately 70 kilowatts of 3-phase AC power. Discussed herein are the means of power distribution as well as a unique power control system that automatically applies power to the start of a work day and provides automatic cut-off under several different conditions. Also, the highly effective and successful ground loop control system utilized here is covered in sufficient detail to aid in the design of similar facilities. (Author)

AD-627 537 Fld. 9/2
CFSTI Prices: HC $3.00 MF $0.50
MASSACHUSETTS INST OF TECH CAMBRIDGE
PROGRAMMING SEMANTICS FOR MULTIPROGRAMMED COMPUTATIONS,
by Jack B. Dennis, and Earl C. Van Horn. Dec 65, 54p. Rept. no. MAC-TR-23
Contract Nonr-4102 (01) Proj. NR-048-189

Unclassified report

Presented at the Association for Computing Machinery, Conference on Programming Languages and Pragmatics, San Dimas, Calif., Aug 8-12 1965. Rept. on Proj. MAC.

Descriptors: (*Programming (Computers), Semantics), (*Semantics, Programming (Computers)), Real time, Programming languages, Computer storage devices, Input-output devices

The semantics are defined for a number of meta-instructions which perform operations essential to the writing of programs in multiprogrammed computer systems. These meta-instructions relate to parallel processing, protection of separate computations, program debugging, and the sharing among users of memory segments and other computing objects, the names of which are hierarchically structured. The language sophistication contemplated is midway between an assembly language and an advanced algebraic language. (Author)

AD-627 696 Fld. 9/2, 20/3, 20/6
CFSTI Prices: HC $1.00 MF $0.50
LABORATORY FOR ELECTRONICS INC BOSTON MASS
ELECTRO-OPTICAL MATRIX DISPLAY.
Interim development rept., 18 Sep-18 Dec 65. 18 Dec 65, 17p. Rept. no. 480-Q5
Contract NObsr-91199

Unclassified report

See also AD-622 551.

Descriptors: (*Thin films (Storage devices), Display systems), (*Electrooptics, Thin films (Storage devices)), (*Computer storage devices, Thin films (Storage devices), Colloids, Glycerols, Glycols, Protective treatments, Amplifiers, Manufacturing methods

Colloidal suspensions in glycerine and glycol-type solvents have been developed which have long term freedom from immobilization, and appear to simplify many aspects of module fabrication. Immobilization behavior observed is attributed in large part to spacing problems, both in nonaqueous and aqueous solvents. New substrate holders and heaters have been constructed to evaporate films over the entire substrate and chromium underlayers are currently in use to increase film adhesion. A cover glass containing internal spacers and sealing surface fabricated by etching with HF has been developed and should simplify spacing and sealing problems. Amplifiers were constructed to drive display elements in AC pulse writing mode, and necessary modification and testing is in progress. Design of the demonstration model to be delivered is in progress and consideration is being given to requirements of illumination and electronics to produce a completely selfcontained unit. (Author)

AD-627 760 Fld. 9/2, 12/1
CFSTI Prices: HC $5.00 MF $1.00
MICHIGAN UNIV ANN ARBOR COLL OF LITERATURE SCIENCE AND THE ARTS
EQUIVALENCES BETWEEN PROBABILISTIC SEQUENTIAL MACHINES.
Doctoral thesis,
by Carl V. Page. Nov 65, 193p. Rept. no. 03105-41-T
Contract Nonr-1224 (21) ,DA-ARO (D)-31-124-G665 Proj. ORA-03105 ,ORA-07363

Unclassified report

Descriptors: (*Computers, Probability), Stochastic processes, Optimization, Control, Stability, Automata, Sequential analysis, Computer logic, Switching circuits

New definitions are introduced of behavioral equivalences, and relationships are shown among the various notions of behavioral equivalence between probabilistic machines. Four basic problems are discussed for several different behavioral equivalences between machines. In what follows the symbol '=' is a variable denoting one of the several behavioral equivelances considered. Given an arbitrary probabilistic sequential machine A: (1) Is there an input-state calculable machine A' (a machine with deterministic switching and random outputs) such that A = A'. (2) What are the machines A' with minimal number of states such that A = A'. (3) How does one obtain all stable modifications of A, i.e., all machines A' such that the switching probabilities of A' and A differ but A

= A'. (4) Is there a finite bound on the length of experiments required to establish whether A = A' holds. The four basic problems are solved completely for some equivalences between machines and are left open for other equivalences. Some applications are made to optimal control problems. (Author)

AD-627 795 Fld. 9/2, 12/1
CFSTI Prices: HC $3.00 MF $0.50
PENNSYLVANIA UNIV PHILADELPHIA
MATHEMATICAL STUDIES FOR SELF-ORGANIZING SYSTEMS.
Final rept. Jun 64-Jun 65,
by Morris Rubinoff, Amy L. Eliasoff, James Korsh, and Donald Shilladay. Jan 66, 53p. Contract AF30 (602)-3030 Proj. AF-5581 Task 558104
RADC 65-378

Unclassified report

Descriptors: (*Computers, Mathematical models), Artificial intelligence, Adaptive systems, Pattern recognition, Algorithms, Programming (Computers), Computer logic, Switching circuits

A detailed technical progress report is given on applicational studies of mathematical models for self-organizing systems. Two specific models have been under investigation, one concerned with systems of interacting trees and graphs and the other with multi-dimensional arrays of mobile interacting elements in a discrete cellular space. The former is being illustrated by the design of a machine (i.e. a computer program) for the automatic logic design of switching systems through boolean graph self-organization under prescribed minimization and circuit restrictions. The latter is being illustrated by the design of a machine for primitive feature recognition through the clustering, reproduction and differentiation of elements under prescribed rules of motion and bonding. (Author)

AD-627 797 Fld. 9/2, 9/1
CFSTI Prices: HC $3.00 MF $0.75
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
SYNTHESIS AND RELAIZATION OF COUNTING BISTABLE CIRCUITS.
Research rept.,
by D. A. Hodges. 31 Aug 65, 98p. Rept. no. ERL-65-33
Contract AF33 (615)-1045 ,AF-AFOSR-139-64

Unclassified report

Descriptors: (*Computer logic, Transistors), (*Transistors, Circuits), Synthesis, Relaxation oxcillators, Trigger circuits, Semiconductor devices, Silicon, Switching circuits, Tunnel diodes, Integrated circuits, Relays, Capacitance

Synthesis procedures are extended for counting bistable circuits from given dc bistable configurations and two silicon-integrated bistable circuits are described. Active devices are presented by a controlled-conductance model which is first derived from a consideration of the principles underlying charge-control device operation. The model is also applicable to non-change-control active devices. These results make evident the straightforward application of the synthesis procedures utilizing enhancement or depletion mode active devices. A linearized active region analysis is carried out for a basic bistable configuration. Either symmetrical or nonsymmetrical triggering techniques are allowed. Conditions are determined for regenerative switching and practical triggering techniques are predicted for the basic FET circuit and a BJT-FET circuit. With minor changes, the conclusions are valid for the cross-coupled and emitter-coupled circuits. A dc bistable circuit and a counting bistable circuit were designed and fabricated in silicon integrated form. Each experimental monolithic circuit incorporates as the active devices one BJT and one FET. Predicted and measured results for dc circuit characteristics and switching times are in reasonable agreement.

AD-627 892 Fld. 9/2, 18/9
CFSTI Prices: HC $6.00 MF $1.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C APPLIED MATHEMATICS LAB
THE FLAME PROGRAM REFERENCE MANUAL,
by E. Cuthill, S. Kenady, J. Schot, R. Mejia, and B. Gibson. Jan 66, 274p. Proj. DA-S-R003-10-01
DTMB 1939

Unclassified report

Descriptors: (*Programming (Computers), Reactor operation), (*Reactor operations, Programming (Computers)), (*Nuclear reactors, Simulation), Nuclear engineering, Fuel burn up, Data processing systems, Digital computers, Compilers, Instruction manuals, Computer logic

This report contains the programming details of all the routines comprising FLAME, a set of UNIVAC-LARC codes which solve a variety of steady-state and time -dependent problem pertaining to the behavior of nuclear reactors. The logic and functioning of the entire program are presented and then each routine is described separately. The many aspects of the code which involve a special attention to detail, such as the content and handling of all data files, the repeated usage of all storage devices, the significance of the controlling parameters, and the flow of the logic for all types of problems, are summarized in charts and tables to facilitate maintenance and complete the documentation of the program. (Author)

AD-627 908 Fld. 9/2, 6/4
CFSTI Prices: HC $3.00 MF $0.75
BELL AEROSYSTEMS CO BUFFALO N Y
A UNIFYING MATHEMATICAL THEORY FOR TRAINING LEARNING NETS.
Final rept.,
by J. G. Goerner, L. A. Gerhardt, and F. D. Powell. 29 Oct 65, 100p. Rept. no. 9500-920032
Contract AF49 (638)-1449 Proj. AF-9769 Task 976906
AFOSR 65-2710

Unclassified report

Descriptors: (*Learning machines, Algorithms), (*Algorithms, Learning machines), Artificial intelligence, Training, Saddle point method, Optimization

This report analyzes the deterministic approaches which have been applied to the description of neural net configurations and their training algorithms which employ a single layer of trainable gain elements and partition the input space by hyperplanes. The nets are described by n-dimensional geometric vector methods. A general algorithm is developed based on gradient or steepest-descent methods for optimizing a system given a quadratic index of performance. Reductions of this algorithm to the two basic classes of (a) error correcting and (b) forced learning algorithms as special cases are considered. Effects are discussed of component imperfections such as saturation, nonlinear adaption rates, hysteresis, and component failure. Examination of advantages and disadvantages of the various algorithms indicate that the error correcting algorithm and its modified forms have the following areas of superiority: (1) capability in separating separable classes, (2) ability to form least-mean-square error for non-separable classes, (3) minimum magnitude gain vector, and (4) relative insensitivity to component imperfections. The forced learning algorithms respond to the relative frequency of the input classes. Where this sensitivity is important, the forced learning algorithm may be superior. (Author)

AD-627 924 Fld. 9/2, 9/6, 9/5, 17/2
CFSTI Prices: HC $4.00 MF $0.75
MITRE CORP BEDFORD MASS
RESEARCH AND EXPERIMENTATION. 1960 - 1964.
Mar 65, 109p. Rept. no. M65-1A
Contract AF19 (628)-2390 ,AF33 (600)-39852

ESD TR-65-407

Unclassified report

Descriptors: (*Communication systems, Scientific research), (*Telemeter systems, Scientific research), (*Data processing systems, Scientific research), (*Systems engineering, Scientific research), Research program administration, Radar equipment, Data transmission systems, Wave transmission, Computers, Information retrieval, Mathematics, State-of-the-art reviews

The technical work reported here results from direct support of systems engineering or systems planning projects, and some relates to research expected to have a broad application to existing problems or to the advancement of science and technology. The research and experimentation activities are divided into nine technological areas: Sensor systems; communications systems; environmental factors; computer and display technology; systems design laboratory; information processing techniques; information transfer; systems studies; and mathematical studies.

AD-627 969 Fld. 9/2, 18/9
CFSTI Prices: HC $4.00 MF $0.75
DAVID TAYLOR MODEL BASIN WASHINGTON D C
THE FLAME OPERATIONS MANUAL.
Research and development rept.,
by Elizabeth Cuthill, Corinne Lundgren, Joanna W.Schot, and Sarah E. Kenady. Dec 65, 111p. Rept. no. 1938
Proj. S-R003-10-01

Unclassified report

Descriptors: (*Programming (Computers), Reactor operation), (*Reactor operations, Programming (Computers)), (*Nuclear reactors, Simulation), Instruction manuals, Digital computers, Computer logic, Mathematical models, Fuel burn up, Nuclear engineering

This report describes the operational features to be followed in setting up and running FLAME production problems on the DTMB UNIVAC-LARC computing system. The three versions of the FLAME Code in production, FLAME 1, FLAME 2, and FLAME 3, solve three-dimensional reactor depletion problems, two -dimensional steady-state problems, and three -dimensional steady-state problems, respectively. Both standard and special procedures for running these codes are described. Detailed reference charts and figures to illustrate the use of the operating system for production runs are included. (Author)

AD-627 974 Fld. 9/2, 9/4
CFSTI Prices: HC $3.00 MF $0.75
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
A NEW METHOD FOR CONSTRUCTING MULTIPLE ERROR CORRECTING LINEAR RESIDUE CODES,
by John T. Barrows,Jr.. Jan 66, 63p. Rept. no. R-277
Contract DA-28-043-AMC-00073 (E) ,NSF-GK-690 Proj. DA-20014501B31F

Unclassified report

Descriptors: (*Programming (Computers), Errors), (*Errors, Corrections), Data transmission systems, Digital computers, Iterative methods, Number theory

Linear residue codes are useful in a number of applications due to their ease of implementation. For error control in data transmission they do not require special equipment; and encoding and decoding operations can easily be carried out in digital computers. They are also useful for checking arithmetic operations in a computer. An iterative procedure is used to construct linear residue codes for

the correction and detection of multiple random errors. This procedure and number -theoretic concepts are used to develop a theory for a class of multiple error correcting codes which have the property that the number of code words is a prime number. Applications to the practical coding problem are also discussed and examples given. (Author)

AD-628 036 Fld. 9/2
CFSTI Prices: HC $7.90 MF $2.25
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
SYNTHESIS OF DIGITAL AUTOMATA,
by V. M. Glushkov. 28 Oct 65, 487p. Rept. no. FTD-MT-64-206
TT 66-60505
Unclassified report

Edited machine trans. of mono. Sintez Tsifrovykh Avtomatov, Moscow, 1962 476p.

Descriptors: (*Digital computers, Synthesis), (*Automata, Digital systems), Circuits, Reliability, Theory, Special functions (Mathematical), USSR, Data processing systems

Contents: General information about conversion of information; Abstract theory of automata; Structural theory of automata; Minimization of Boolean functions; Methods of construction of combinational circuits in binary structural alphabet; Certain problems of reliability of digital automata; The algroithmic structure of a contemporary universal digital machine.

AD-627 344 **See Fld. 22/3**

AD-627 364 **See Fld. 22/3**

AD-627 365 **See Fld. 22/3**

AD-627 414 **See Fld. 22/3**

AD-627 418 **See Fld. 5/1**

AD-627 431 **See Fld. 20/3**

AD-627 474 **See Fld. 20/4**

AD-627 520 **See Fld. 5/1**

AD-627 682 **See Fld. 12/1**

AD-627 700 **See Fld. 8/2**

AD-627 745 **See Fld. 20/1**

AD-627 791 **See Fld. 5/2**

AD-627 968 **See Fld. 12/2**

9/3. ELECTRONIC AND ELECTRICAL ENGINEERNG

AD-627 525 Fld. 9/3, 9/5
CFSTI Prices: HC $2.00 MF $0.50
WASHINGTON UNIV SEATTLE COLL OF ENGINEERING
UNEQUALLY SPACED ARRAYS FED FROM TRAVELING WAVE SOURCES.
Technical rept.,
by J. N. Lahti, and Akira Ishimaru. Sep 65, 40p. Rept. no. TR-75
Contract AF19 (628)-2763 Proj. AF-5635 Task 563502
AFCRL 65-721
Unclassified report

Descriptors: (*Antenna radiation patterns, Antenna arrays), (*Antenna arrays, Antenna radiation patterns), Mathematical analysis, Antenna feeds, Traveling-wave tubes, Asymmetric bodies, Theory, Waveguides, Antenna apertures

The paper deals with the problems encountered when one wishes to synthesize a specified radiation pattern with a unequally spaced array which utilizes a traveling wave feed system. A differential equation is developed which relates the amplitude distribution to the source position function of such an array. Solutions of this equation are found which allow the synthesis of a broad class of radiation fields. The theory is used to design a traveling wave fed unequally spaced array to produce the 'cosecant squared' pattern. Theoretical and experimental results are observed to be in good agreement. (Author)

AD-627 865 Fld. 9/3, 9/5
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF RADIO AND ELECTRICAL ENGINEERING
ADJUSTABLE COMPLEX-RATIO TRANSFORMER,
by P. N. Miljanic. 23 Feb 65, 7p.
NRC 8664
Unclassified report

Availability: Published in IEEE Transactions on Instrumentation and Measurement v1M-14 n3 p135-41 Sep 1965. Copies to DDC users only.

Descriptors: (*Comparators, Electric currents), (*Transformers, Comparators), Alternating currents, Measuring devices (Electrical + electronic), Electrical engineering

A four-terminal network in which the complex output-to-input ac current or voltage ratio may be adjusted is described. The design of an experimental Adjustable Complex-Ratio Transformer for use at a frequency of 60 Hz, in which the output-to-input current ratio can be adjusted with two sets of 5 decade dials to 0.1 percent accuracy, is presented. The application of the instrument for the direct reading of the difference of two alternating currents is discussed. (Author)

AD-627 866 Fld. 9/3, 9/1
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF RADIO AND ELECTRICAL ENGINEERING
COMPARISON OF STANDARD RESISTORS BY THE DC CURRENT COMPARATOR,
by S. K. Basu, and N. L. Kusters. 6 Mar 65, 8p.
NRC 8666
Unclassified report

Availability: Published in IEEE Transactions on Instrumentation and Measurement v1M14 n3 p149-56 Sep 1965. Copies to DDC users only.

Descriptors: (*Resistors, Calibration), (*Comparators, Direct current), Measuring devices (Electrical + electronic), Electrical engineering

Measurements and comparison of standard resistors are generally carried out in Standards Laboratories employing the well-known Wheatstone and Kelvin bridges. In the present paper the use of a dc current comparator has been described in order to compare a set of standard resistors. The results obtained lie within 1 to 5 ppm of those determined by the conventional methods. It is believed that with some refinements this method may, in the future, be accepted as an alternative approach of measuring standard resistors in laboratories.

AD-627 904 Fld. 9/3
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
OBTAINING A LOGARITHMIC AMPLITUDE CHARACTERISTIC IN AN R-F AMPLIFIER BY CATHODIC DETECTION,
by V. M. Volkov, and V. F. Andrienko. Dec 65, 10p. Rept. no. FSTC-381-T65-622
TT 66-60492
Unclassified report

Trans. of Radiotekhnika (USSR) v19 n11 p37-41 1964.

Descriptors: (*Logarithmic amplifiers, Design), Performance (Engineering), Electronics, Wiring diagrams, Radio equipment, USSR

An analysis was made of a logarithmic amplifier with cathodic detection, giving high logarithmic accuracy. The report examines sequential summing with cathodic detection. All of the amplifier tubes are in amplification and cathodic detection mode so that each stage in addition to amplifying h-f voltage and feeding it to the next stage, detects r-f voltages and, independently of the other stages, feeds the video component of the output voltage to a common load. The load of the cathode detector is a large bias resistor R sub k in the cathode circuit of the amplifier stage. The video voltage appearing across this resistor automatically controls the amplification of the stage with respect to the r-f frequency as the signal increases. The time constant of the cathode circuit must be much shorter than the rise time of the pulse. In order for signal detection and amplification control to be effective at relatively low signal levels, and for amplification of these signals to be maintained, it is necessary to use such tubes as the 6Zh1B and 6Zh1P, that have short plate grid characteristics, with the operating point on the lower part of the linear segment of the characteristic. The detection and amplification control effects of the stage increase as the value of resistor R sub k is increased, but the initial bias voltage E sub sn also grows. (Author)

AD-628 012 Fld. 9/3
CFSTI Prices: HC $2.00 MF $0.50
RADIO CORP OF AMERICA CAMDEN N J COMMUNICATIONS SYSTEMS DIV
MICROMODULE LIFE TEST PROGRAM.
Quarterly progress rept. no. 3, 17 Mar-17 Jun 65, by F. E. Farmar. 17 Jun 65, 39p. Contract DA-36-039-AMC-01462 (E)
Unclassified report

See also AD-616 744.

Descriptors: (*Microminiatruization (Electronics), Modules (Electronic)), (*Modules (Electronic), Life expectancy), Analog systems, Digital systems, Electronic equipment, Failure (Electronics), Reliability (Electronics), Test methods

A total of 2682 micromodules remained on life test at the beginning of this quarter and eight failures occurred during this period. The number of failures, accumulated operating time, and best estimate mean-time-to-failure (MTTF) for life testing to date are presented in tabular form. Included in the number of failures for the XM-1364 modules are 33 failures that were caused by inserting the module in the test socket or the life test board in the wrong position. This will provide the wrong voltages to be applied to the module riser wires causing permanent module damage. It is planned to continue testing in subsequent periods until surviving micromodules have each accumulated 10,000 hours of operation. (Author)

AD-628 025 Fld. 9/3, 20/2, 20/3, 20/5, +
CFSTI Prices: HC $4.00 MF $0.75
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES ELECTRONIC SCIENCES LAB
JOINT SERVICES ELECTRONICS PROGRAM.
Final rept., 1 Sep 64-31 Aug 65.
31 Aug 65, 110p. Contract AF-AFOSR-496-65
AFOSR 65-2648
Unclassified report

Descriptors: (*Electronics, Scientific research), Solid state physics, Semiconductors, Lasers, Magnetism, Paramagnetic resonance, Magnetic materials, Conductivity, Nuclear magnetic resonance, Crystal lattice defects,

Cadium compounds, Sulfides, Superconductors, Electromagnetism, Plasma physics, Plasma medium, Excitation, Scattering, Electromagnetic waves, Propagation, Information theory, Control systems, Computers, Coding

AD-627 447 See Fld. 9/5

AD-627 523 See Fld. 20/12

AD-627 635 See Fld. 20/14

AD-627 674 See Fld. 13/9

AD-627 683 See Fld. 12/2

AD-627 717 See Fld. 12/2

AD-627 724 See Fld. 20/3

AD-627 762 See Fld. 9/5

AD-627 912 See Fld. 9/1

AD-627 920 See Fld. 13/9

AD-627 970 See Fld. 9/5

9/4. INFORMATION THEORY

AD-627 488 Fld. 9/4, 20/10
DELAWARE UNIV NEWARK DEPT OF ELECTRICAL ENGINEERING
A QUANTUM FIELD DESCRIPTION OF COMMUNICATION SYSTEMS,
by L. F. Jelsma, and L. P. Bolgiano. 1964, 8p.
Contract AF-AFOSR-2-65
AFOSR 65-2038

Unclassified report

Availability: Published in IEEE Annual Communications Convention Conference Record, p635-42, Jun 1965. Copies to DDC users only.

Descriptors: (*Communication systems, Quantum statistics), (*Field theory, Communication systems), Information theory, Entropy, Statistical mechanics, Quantum mechanics, Probability, Operators (Mathematics), Equations of motion, Harmonic generators

It is demonstrated that the statistical properties of a communication system can be determined by basic concepts in quantum field theory and the utility is shown of the Heisenberg picture in the quantum formulation. The quantum field formulation is for electromagnetic fields which interact with the current densities controlled by the transmitter. Maxwell's equations in this formulation are replaced by the simple operator equations of motion of the forced harmonic oscillator whose solutions are in terms of the destruction operator, the creation operator, and the current density. It is shown that probability functions for communication theory can be obtained from quantum field theory and in some cases the statistical analysis is simplified. The simplification is accomplished by utilizing the eigen kets and bras of the destruction operator.

AD-627 687 Fld. 9/4
NEW YORK UNIV N Y DEPT OF ELECTRICAL ENGINEERING
ON AN EXTENDED CLASS OF ERROR-LOCATING CODES,
by Jack K. Wolf. 13 Jul 64, 9p. Contract AF-AFOSR-499-65 Proj. AF-9749 Task 974901
AFOSR 65-2064

Unclassified report

Availability: Published in Information and Control, v8 n2 p163-9 Apr 1965. Copies to DDC users only.

Descriptors: (*Coding, Optimization), Control, Information theory, Matrix algebra, Binary arithmetic, Errors

An explicit method of constructing error-location (EL) codes is presented for the case where errors occur in multiple sub-blocks. The procedure is applicable both when the erroneous sub-blocks occur randomly throughout the message and when they occur in bursts. The method allows for a wide range in redundancy and errorlocation capability. The method of construction is outlined for an EL code which locates errors occurring within 2 or fewer random sub-blocks. A general decoding procedure for the codes is presented. (Author)

AD-627 357 See Fld. 17/2

AD-627 452 See Fld. 17/2

AD-627 544 See Fld. 17/2

AD-627 645 See Fld. 17/1

AD-627 974 See Fld. 9/2

9/5. SUBSYSTEMS

AD-627 271 Fld. 9/5, 14/2
CFSTI Prices: HC $1.00 MF $0.50
FREQUENCY ELECTRONICS INC ASTORIA N Y
LOW POWER PROPORTIONAL CONTROL CRYSTAL OVENS, TYPE M6 AND N13.
Quarterly rept. no. 1, 1 Jul-31 Oct 65,
by M. B. Bloch, I. Math, and John C. Ho. Oct 65, 15p. Contract DA-28-043-AMC-01475 (E)
Proj. DA-1P6-22001-A-058-02
ECOM 01475-1

Unclassified report

Descriptors: (*Crystal ovens, Temperature control), Miniature electronic equipment, Quartz, Control systems, Silicon, Transistors, Temperature sensitive elements, Resistors, Electric bridges, Integrated circuits

The purpose of this project is to design, construct and evaluate two types of miniature low power ovens for regulating the temperature of quartz crystals. The temperature of the ovens is to be controlled by a proportional sensing system, and the crystals are to be accessible. One type of oven, the M6, is to maintain one HC6/u crystal at some preset temperature between 80C. and 90C. to within plus or minus .2C. over an ambient temperature range of -55C. to +75C. The volume of this oven cannot exceed 3 cubic inches and the maximum average power delivered, 400 mw. The N13 oven is to maintain two HC6/u crystals at some preset temperature between 0C. and 5C. to within plus or minus .2C. over an ambient range of -55C. to -15C. The volume of this oven cannot exceed 5 cubic inches, and the maximum average power delivered, 150 mw. The M6 oven must reach operating temperature in 10 minutes and the N13 oven, within 3 minutes. Both ovens can utilize up to 3 watts for rapid warm-up. (Author)

AD-627 322 Fld. 9/5, 17/9
CFSTI Prices: HC $6.00 MF $1.25
ANDREW CORP ORLAND PARK ILL
STRUCTURAL AND COST OPTIMIZATION OF THE MULTIPLATE ANTENNA REFLECTING PANELS.
Final rept. Sep 64-Apr 65,
by Anthony Lacopulos. Sep 65, 209p. Contract AF19 (628)-4319 Proj. AF4600 Task 460007
AFCRL 65-790

Unclassified report

Descriptors: (*Radar reflectors, Design), (*Antenna arrays, Space surveillance systems), Costs, Optimization, Supports, Structures, Antenna components, S-band, Construction, Radio telescopes, Radar tracking, Radar equipment, Space surveillance systems

The report presents the results of a research effort dedicated to optimizing the structural design and manufacturing the erection costs of the reflecting panels used in conjunction with the proposed Multiplate Antenna project. The study primarily considers the reflecting panel construction with only limited attention to related pedestals, foundations, actuating components, etc. The report discusses surface contours, allowable tolerances, error contributors and panel sizes. Structural requirements are discussed and methods of solution presented. Results of stress and deflection analyses are given for alternate design concepts. Manufacturing, installation and cost evaluations are used to arrive at final recommendations. The recommended reflecting panel construction consists of a three-dimensional network of tubular members (space frame) supporting a rectangular rib framework. The rib framework in turn supports a welded wire mesh surface. An adjustment feature is built into the proposed construction to create variable surface contours. Section II contains a complete description of the final recommendations. The cost of supplying enough panels to cover 2 million sq. ft. of antenna surface is $2.85 million dollars or less than $1.50 per sq. ft. (Author)

AD-627 376 Fld. 9/5
CFSTI Prices: HC $3.00 MF $0.75
PHILCO CORP BLUE BELL PA ADVANCED TECHNOLOGY CENTER
ADVANCED ANTENNA TECHNIQUES.
Final rept. 26 Oct 64-26 Oct 65,
by Leo W. Procopio, Thomas K. Kashihara, and Stephen Czorpita. Nov 65, 69p. Contract AF19 (628)-4769 Proj. AF-4600 Task 460006
AFCRL 65-907

Unclassified report

See also AD-621 555.

Descriptors: (*Antenna configurations, Theory), (*Resolution, Antenna configurations), Radiation patterns, Statistical functions, Synthesis, Correlation techniques, Phased arrays, Bandwidth, Gain, Electronic scanners, Multiple beam antennas, Azimuth, Omidirectional antennas, Dipole antennas, Phase shift

Investigations were conducted to extend the work of past researches in the areas of angular dispersioncompression antennas, superdirective apertures, and multidimensional resolution theory. Some new antenna techniques based on the dispersion-compression concept were studied. These antennas, with circular or cylindrical form factors achieve omidirectional coverage, and multiple beam formation. Preliminary investigations were also conducted to determine the complex illumination functions which can produce pseudo-random antenna patterns having good autocorrelation properties. (Author)

AD-627 417 Fld. 9/5
CFSTI Prices: HC $4.00 MF $1.00
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
H-GUIDE LOG-PERIODIC SLOT ANTENNA.
Research rept.,
by George N. Voronoff. 6 Dec 65, 136p. Rept. no. ERL-65-34
Contract AF-AFOSR-139-65

Unclassified report

Descriptors: (*Log periodic antennas, Slot antennas), (*Slot antennas, Log periodic antennas), Standing wave ratios, Antenna radiation patterns, Antenna arrays, Design, Theory

A theoretical and experimental investigation of an end-fire (as contrasted to a conventional backfire design) flush-mounted log-periodic slot antenna is described. The antenna consists of two-periodic slot arrays cut in one of the metal walls of a tapered Hguide. The antenna receives excitation at the large end of the structure and radiates toward the small end, yet retaining pattern integrity over large bandwidth. This is made possible by judiciously employing the surface wave properties of a broadband TEsub01 mode propagated in a tapered H-guide. It has been shown theoretically that the energy can be transported from the large end of the structure to a desired active region located near the small end, without appreciably ex-

citing the preceding portions of the antenna. The results of the near field measurements, antenna VSWR, and radiation patterns are presented. The antenna radiates essentially constant patterns over a 3:1 bandwidth with half-power beamwidths of approximately 20 degrees in the E- and H-planes. The results of this study indicate that the antenna can generate a narrow beam and is potentially capable of transmitting high power. (Author)

AD-627 446 Fld. 9/5, 17/2.1
CFSTI Prices: HC $2.00 MF $0.50
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV
PRODUCTION ENGINEERING MEASURE FOR SILICON LINEAR INTEGRATED CIRCUITS.
Quarterly progress rept. no. 1, 20 Apr-20 Jul 65. by Robert McGinnis, Thomas Quaid, and John Hatchett. 20 Jul 65. 47p. Contract DA-36-039-AMC-06158 (E) Proj. DA-25001
Unclassified report

Descriptors: (*Radio receiver, Frequency modulation), (*Integrated circuits, Radio receivers), (*Semiconductor devices, Integrated circuits), Limiters, Amplifiers, Audio amplifiers, Packaged circuits, Linear systems, Portable, Radio equipment, Design, Communication equipment, Wiring diagrams, Performance (Engineering)

This report describes the work accomplished during the first quarterly period in the effort to eventually produce silicon linear integrated circuits of the type used in FM receivers. Most of the effort was devoted to developing the receiver back-end circuits; i.e., the circuits the follow the i-f filter. During the first quarter, circuits designed to replace the IC500 (i-f amplifier), IC501 (limiter), IC502 (squelch), and IC503 (audio amplifier) were breadboarded and tested. The receiver back-end circuits are comprised of three integrated circuits, as outlined below, and a conventional circuit discriminator. (1) IF Amplifier: The four i-f amplifier stages are to be packaged in two TO-5 cans with two amplifier stages occupying the same chip. (2) Limiter/Squelch: Occupying the same chip will be the limiter, squelch noise amplifiers, and the squelch switch. (3) Audio Amplifier: A class B push-pull amplifier was selected after careful comparison with a class A amplifier. (Author)

AD-627 447 Fld. 9/5, 9/3
CFSTI Prices: HC $1.00 MF $0.50
MICROWAVE ASSOCIATES INC BURLINGTON MASS
HIGH POWER BROADBAND MULTI-THROW DIODE SWITCHES.
Quarterly rept. no. 2, 31 Jul-31 Oct 65. by R. Brunton. 31 Oct 65. 24p. Contract NObsr-93266 Proj. SR-008-0302 Task 9604
Unclassified report

Descriptors: (*Diodes (Semiconductor), Electronic switches), (*Electronic switches, Transmission lines), Switching circuits, Broadband, Theory, Specifications, Design

This report contains results obtained during the second quarterly period of this contract. Sections are devoted to discussion of the theoretical study of the diode switch. The first section is a discussion of the transfer characteristics of a two diode switch. A second section is a discussion of compensated tee mode single pole double throw switch circuit. Also included is a design for a five stub broadband design which is a result of the theoretical study. (Author)

AD-627 469 Fld. 9/5, 9/1
CFSTI Prices: HC $1.00 MF $0.50
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
STUDY OF CROSSED-FIELD AMPLIFIERS.
Quarterly progress rept. no. 9, 16 Jun-15 Sep 65. by R. A. Rao, T. Van Duzer, S. P. Yu, G. A. Poeand, and A. Sasaki. 15 Sep 65. 22p. Contract DA-36-039-AMC-02164 (E) Task 3A99-13-001
Unclassified report

See also AD-626 183.

Descriptors: (*Crossed field devices, Microwave amplifiers), (*Amplifiers, Crossed field devices), Electromagnetic shielding, Electron guns, Backward wave amplifiers, Noise (Radio), Cathodes (Electron tubes), Magnetrons, Space charges, Theory

As a part of the project on the shield-gun low noise amplifier, a method of synthesizing crossed-field guns was developed and used to design an electron gun that produces an electron beam having Kino flow characteristics near the cathode and satisfying Brillouin flow conditions near the drift region. Experimental results on the gun built on this basis show excellent agreement with theoretical predictions. The secondorder corrections to the solution of the first-order paraxial-ray equation used in the synthesis are discussed. The normal mode approach is used to derive the invariant noise parameters of crossed-field amplifiers with an objective to determine the minimum noise-figure. Results of the noise-figure studies based on the field approach are compared with experiment. A simple approximate method to determine the dc potential minimum parameters V sub m and Y sub m is proposed. The difficulty of determining V sub m and Y sub m independently is discussed. Important experimental results, verifying a novel statistical theory of the smooth-bore magnetron, are also reported. (Author)

AD-627 492 Fld. 9/5, 20/3
CFSTI Prices: HC $2.00 MF $0.50
MARTIN CO ORLANDO FLA
QUANTUM MULTIPLIERS AND MIXERS.
Quarterly progress rept. no. 2, 1 Aug-31 Oct 65. by V. E. Derr, G. W. Bechtold, and R. A. Kempf. Jan 66. 42p. Rept. no. OR-6825
Contract DA-28-043-AMC-01320 (E) Proj. DA-1P6-22001-A-05803
Unclassified report

See also AD-623 470.

Descriptors: (*Electron multipliers, Pumping (Electronics)), (*Mixers (Electronics), Pumping (Electronics)), (*Harmonic generators, Halogenated hydrocarbons), (*Interferometers, Design), (*Crystals, Quantum mechanics), Signal generators, Millimeter waves, Submillimeter waves, Submillimeter waves, Vacuum apparatus, Magnetrons, Masers, Molecular energy levels, Chlorides, Fluorides

A theoretical analysis of problems related to the third harmonic generation in methyl fluoride is given. The design and construction of the doubly resonant parallel plate interferometer, to be used in a large vacuum chamber for the investigation of totally resonant systems, is discussed. The experimental effort is reviewed. The bulk of this effort was concerned with fabrication and testing of the vacuum system, evaluation of magnetrons and magnetron power supplies, and a series of tests to search for third harmonics in methyl fluoride. A discussion of further studies of nonlinear effects in solid state materials is presented. A study of the possible use of methylene chloride in a totally resonant system was undertaken. An improved computer program for the Kivelson-Wilson technique to determine energy levels was started. (Author)

AD-627 521 Fld. 9/5, 9/1
CFSTI Prices: HC $1.00 MF $0.50
FORSVARETS FORSKNINGSINSTITUTT KJELLER (NORWAY)
EXPERIMENTAL STUDIES OF UNUSUAL EFFECTS IN FAST CYCLOTRON WAVE AMPLIFIERS,
by A. Nordbotten. 15 Sep 65. 12p. Rept. no. Scientific-3 .Intern rapport - E-66
Contract AF61 (052)-683
RADC TR-66-27
Unclassified report

See also AD-612 028.

Descriptors: (*Cyclotron waves, Amplifiers), (*Microwave amplifiers, Gain), Electron beams, Electron tubes, Electron guns, Magnetic fields

Experiments are described with transverse wave amplifiers without pump structure. Two tubes have been built and tested. The first employed three identical Cuccia couplers separated by drift regions. The net gain was strongly dependent on the coupler spacings. The second tube had bellows permitting continuous variation of the distance between the two couplers employed. Net gain was observed, but it was impossible to find any definite correlation between drift length and gain. In addition some experiments with various gun configurations are described. (Author)

AD-627 522 Fld. 9/5, 9/1
CFSTI Prices: HC $1.00 MF $0.50
FORSVARETS FORSKNINGSINSTITUTT KJELLER (NORWAY)
TRANSVERSE WAVE INTERACTION IN ELECTRON DEVICES.
Annual summary rept. no. 1, 1 Mar 63-1 Sep 65. by W. Thon. 30 Sep 65. 14p. Rept. no. Intern rapport-E-68
Contract AF61 (052)-683
RADC TR-66-26
Unclassified report

See also AD-627 521.

Descriptors: (*Electron beams, Amplifiers), (*Gain, Amplifiers), Electron tubes, Cyclotron waves, Tuning devices, Magnetic fields, Radiofrequency power, Oscillators

Experimental evidence was accumulated regarding amplification at 600 MHz by means of a thin electron beam and two Cuccia couplers (no pump structures). Gains up to 30 db were readily reproducible, but the RF ower output was less than one milliwatt at a few per cent efficiency. Tuning by the dc magnetic field and by the beam voltage was demonstrated. The process seems to depend upon dc modes excited in the beam by its irregular injection into the magnetic field. Experiments with an oscillator based upon a hollow beam and a single Cuccia coupler are also included. (Author)

AD-627 673 Fld. 9/5, 20/12, 20/9
CFSTI Prices: HC $4.00 MF $1.00
MICHIGAN UNIV ANN ARBOR
MICROWAVE PHENOMENA.
Interim scientific rept. no. 4, 1 Jun-1 Dec 65. by G. I. Haddad, G. T. Konrad, R. J. Lomax, and J. E. Rowe. Dec 65. 150p. Rept. no. ORA-06349-11-S
Contract AF33 (615)-1553 Proj. ORA-06349
Unclassified report

Descriptors: (*Microwave equipment, Semiconductor devices), Microwave amplifiers, Microwave oscillators, Cerenkov radiation, Millimeter waves, Electron beams, Plasma medium, Infrared radiation, Microwave networks, Impurities, Traveling-wave tubes, Parametric amplifiers, Masers, Tuned amplifiers, Submillimeter waves

Contents: Relativistic electron beam interaction; Cold-cathode plasmas; Radiation from solids; Instabilities in solids; Traveling-wave parametric amplifiers and voltage-tunable circuits; Stimulated emission of radiation studies; Millimeter- and submillimeter-wave detectors.

AD-627 684 Fld. 9/5
CFSTI Prices: HC $2.00 MF $0.50
BENDIX CORP DAVENPORT IOWA PIONEER-CENTRAL DIV
FREQUENCY TEMPERATURE COMPENSATION TECHNIQUES FOR QUARTZ CRYSTAL OSCILLATORS.

Quarterly rept. no. 8. 1 Jun-31 Aug 65.
30 Sep 65. 41p. Rept. no. Pub-3419-65
Contract DA-36-039-AMC-02282 (E) Proj. DA-1P6-22001-A-058

Unclassified report

See also AD-624 018.

Descriptors: (*Crystal oscillators. Quartz). Temperature. Stabilization. Circuits. Frequency. Mathematical analysis. Temperature control

The report involves the development of circuit techniques for the frequency temperature compensation of three quartz crystal oscillator groups, defined by specific frequency temperature stability characteristics by Electronics Command Requirement SCL-6657 dated October 1964. Three computer programming approaches which have been investigated as part of the effort to develop more accurate compensation techniques with a minimum effort are discussed. This effort will ultimately result in the precise selection of network values along any ten points of a frequency-temperature curve. The preliminary design of the Group II oscillators is discussed in detail. It is anticipated that this circuit will serve as the basic design for the Group III and Group IV oscillators to be built under this program. An investigation of the effects of frequency adjustment on frequency stability has been conducted during this past quarterly period and is covered in this report. Finally, crystal parameter measurement techniques using standard laboratory instruments are discussed. (Author)

AD-627 762 Fld. 9/5, 17/2, 9/3
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
ANALYSIS OF A NEW CLASS OF PULSE-FREQUENCY MODULATED FEEDBACK SYSTEMS.
Revised ed.,
by T. Pavlidis, and E. I. Jury. 5 Oct 64. 19p.
Contract AF-AFOSR-292-64
AFOSR 65-2433

Unclassified report

Revision of manuscript submitted 13 Jul 64.

Availability: Published in IEEE TRANSACTIONS ON AUTOMATIC Control vAC-10 n1 p35-43 Jan 1965. Copies to DDC users only.

Descriptors: (*Pulse frequency modulation, Feedback), (*Feedback, Pulse frequency modulation), Modulators, Stability, Nonlinear systems, Oscillation, Fourier analysis, Series, Communication systems, Control systems

A new class of pulse-frequency modulated systems is presented. These systems referred to here as sigma-PFM have many advantages over previously used schemes such as integral PFM. Most significant advantages are improved stability and simpler physical implementation of the modulator. The major part of the paper is concerned with the study of sustained oscillations using a specially developed quasi-describing function. One important feature of these kinds of PFM systems is that they often present a limit annulus and not a limit cycle, a feature which is common in most nonlinear discrete feedback systems. A few examples with experimental verification are presented and the limitations of the method are discussed. (Author)

AD-627 896 Fld. 9/5
CFSTI Prices: HC $2.00 MF $0.50
MARCHETTI (J W) INC NATICK MASS
ANTENNA ARRAY ELEMENT STUDY.
Quarterly interim rept. no. 1.
by M. B. Haslam, and W. A. Murphy. Jan 66.
34p. Rept. no. G-149-QR-1
Contract AF30(602)-3707 Proj. AF-4506 Task 450604
RADC TR-65-357

Unclassified report

Descriptors: (*Antenna arrays, Antenna radiation patterns), (*Antenna radiation patterns, Antenna arrays), (*Information retrieval, Antenna arrays), Phased arrays, Documentation, State-of-the-art reviews, Power, Electrical impedance, Bandwidth, Gain, Polarization

An investigation and analytical study of antenna array elements is being carried out to determine the influence of an individual element of specific characteristics on the performance of an array and, on the basis of element performance, present data which would assist the element designer in selecting the optimum element. A comprehensive literature survey will form part of the basis for, and become a supplement to, the analytical study. While the literature survey is to cover and record any type and size of array with any number of elements, the analytical investigation will analyze element behavior and result in a determination of element characteristics in the UHF (400 Mc) through X-Band (10.5 Gc) range of frequencies. Other parameters and limits for the analytical investigation include: (1) Power handling capability (100 watts to 20 kilowatts); (2) Terminal impedance (25 ohms to 1000 ohms); (3) Signal bandwidths (from 101 /o at UHF to 51/o at X-Band); (4) Gain; (5) Polarization; (6) Beamwidth. For the literature search portion of the project, a retrieval file system was designed and the file keysort cards for the system produced; several literature sources and contacts were established; and literature source data has been retrieved and entered on the Keysort cards as the program progressed. (Author)

AD-627 914 Fld. 9/5, 17/2.1
CFSTI Prices: HC $3.00 MF $0.50
RADIO CORP OF AMERICA CAMDEN N J COMMUNICATIONS SYSTEMS DIV
MODULES (INTEGRATED CIRCUITS) FOR COMMUNICATIONS.
Quarterly rept. no. 2. 1 Apr-30 Jun 65.
by A. M. Hoque. Jan 66. 54p. Contract DA-28-043-AMC-00454 (E) Proj. DA-1P6-22001-A-057-03

Unclassified report

Descriptors: (*Communication equipment, Integrated circuits), (*Intermediate frequency amplifiers, Integrated circuits), (*Transponders, Integrated circuits), (*Integrated circuits, Tests), Analog systems, Optimization, Video amplifiers, Logarithmic amplifiers, Identification systems, Broadband, Tuned amplifiers, Performance (Engineering)

The purpose of the 'Modules (Integrated Circuits) for Communications' Program is to demonstrate the application of integrated circuits is analog communications equipment, the demonstration vehicle being an IF-video functional assembly for the Mark X IFF Transponder. Four design approaches for implementing the Lin-Log 60-megacycle IF amplifier were investigated. Each design was developed to optimize certain performance functions in the amplifier. Two new analog integrated circuits have been evaluated. The characteristics of these two devices are superior to those evaluated previously. (Author)

AD-627 965 Fld. 9/5, 9/1
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING
REALIZATION OF IRRATIONAL IMPEDANCES BY INFINITE LENGTH CASCADED NETWORKS.
Revised ed.,
by R. M. Gagliardi, and A. Beihaghi. Sep 64. 3p.
Contract AF-AFOSR-496-64
AFOSR 65-2103

Unclassified report

Revision of manuscript submitted Jun 1964.

Availability: Published in IEEE Transactions on Circuit Theory vCT-12 n2 p290-2 Jun 1965. Copies to DDC users only.

Descriptors: (*Electrical impedance, Electrical networks), (*Electrical networks, Cascaded structures), Synthesis, Functions, Continued fractions

An interest in tapered impedances has led to the problem of having to realize irrational impedance functions with passive networks. As is well known, the condition of positive realness is necessary for the realization of any passive impedance function, with the condition becoming sufficient if the function is rational meromorphic. Further, such rational functions require only a finite number of elements. No such complete theory is available for irrational functions, however, and any true realization will require an infinite number of elements, if such a design can be hypothesized. In this correspondence, an attempt is made to develop some sufficiency conditions and formal design procedures for a class of irrational impedance functions of the form: Z (s) = (T) the square root of P (s) where P (s) is rational meromorphic and the (+) indicates the root having a positive real part.

AD-627 970 Fld. 9/5, 9/3
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS
USEFUL TIME-VARIABLE CIRCUIT-ELEMENT EQUIVALENCES,
by B. D. Anderson, D. A. Spaulding, and R. W. Newcomb. 6 Apr 65. 2p. Contract AF-AFOSR-337-63
AFOSR 65-2357

Unclassified report

Availability: Published in Electronics Letters May 1965. Copies to DDC users only.

Descriptors: (*Electrical networks, Synthesis), (*Circuits, Synthesis), Electrical engineering

Because time-variable circuit elements have properties not possessed by time-invariant ones, such as the ability to modulate or amplify with low noise, it is useful to have different ways of looking at them. Here we present general equivalences for time-variable inductors, capacitors, resistors and gyrators, using time-invariant elements and time-variable transformers, which allow various properties to be determined and interpreted on physical grounds. (Author)

AD-627 993 Fld. 9/5, 22/2
CFSTI Prices: HC $3.00 MF $0.75
FAIRCHILD HILLER CORP BLADENSBURG MD ELECTRONIC AND INFORMATION SYSTEMS DIV
THIN FILM MICROCIRCUITS FOR ROCKETSONDE.
Quarterly rept. no. 1. 1 Jun-31 Aug 65.
by B. J. Patton, P. Berger, and J. Sperling. Jan 66. 66p. Contract DA-28-043-AMC-01389 (E)
Proj. DA-1C0-24401-348-0051
ECOM 01389-1

Unclassified report

Descriptors: (*Films, Circuits), (*Microminiaturization (Electronics), Circuits), (*Circuits, Microminiaturization (Electronics)), Tantalum, Tantalum capacitors, Resistors, Radiosondes, Sounding rockets

Sample patterns for evaluation of tantalum thin-film resistors and capacitors were designed and all necessary art work and photography completed. Elements have been prepared and processed to ensure stabilization prior to testing. Special test fixtures have been designed and completed to facilitate evaluation of component performance. Proposed schedule of testing is provided. Circuit study with regard to the application of miniature components has been undertaken. Evaluation of miniature diode, transistors, and transformers has been applied to the blocking oscillator and the solid state commutator. A thin film version of the blocking oscillator has been studied in breadboard form to compare its performance with one composed of discrete conventional components. (Author)

AD-627 426 See Fld. 20/6

AD-627 431 See Fld. 20/3

AD-627 465 See Fld. 17/9

AD-627 475 See Fld. 17/3

AD-627 520 See Fld. 5/1

AD-627 525 See Fld. 9/3

AD-627 528 See Fld. 17/9

AD-627 579 See Fld. 20/5

AD-627 654 See Fld. 14/4

AD-627 838 See Fld. 7/4

AD-627 865 See Fld. 9/3

AD-627 924 See Fld. 9/2

AD-627 932 See Fld. 17/9

9/6. TELEMETRY

AD-627 868 Fld. 9/6, 4/2
CFSTI PricesMF $0.50
BUREAU OF NAVAL WEAPONS WASHINGTON D C
MANUAL FOR RADIOSONDE CODE (WBAN). (STANDARDS AND PROCEDURES FOR THE CODING OF RADIOSONDE REPORTS). SECOND EDITION,
1 Jan 64, 31p. Rept. no. NAVWEPS-50-1D-501
Unclassified report

Availability: Available from Superintendent of Documents, Government Printing Office, Washington, D. C., 20402. HC $0.25.

Descriptors: (*Telemetering data, Coding), (*Radiosondes, Coding)

The manual contains the Standards and Procedures established by the WMO and the United States for the coding of Radiosonde Reports. These instructions are intended for use only in the coding and decoding of Radiosonde Messages. References to observing procedures, recording of the observations, and communications will be made only when necessary to explain coding procedures. It is recommended that all concerned consult the appropriate publication for instructions on observing procedures, communications, the recording of data on forms, etc. when detailed information on those operations are required. (Author)

AD-627 422 See Fld. 9/2

AD-627 924 See Fld. 9/2

Field 10-ENERGY CONVERSION (NON-PROPULSIVE)

10/1. CONVERSION TECHNIQUES

AD-627 658 Fld. 10/1, 20/9, 7/4, 20/3
CFSTI Prices: HC $1.00 MF $0.50
STANFORD UNIV CALIF
DIRECT ENERGY CONVERSION SYSTEMS.
Final technical rept. 1 Nov 61-30 Sep 65,
by Robert H. Eustis. 29 Oct 65, 25p. Contract AF49 (638)-1123 ,ARPA Order-246
AFOSR 65-2013
Unclassified report

See also AD-609 415.

Descriptors: (*Energy conversion, Magnetohydrodynamic generators), (*Magnetohydrodynamic generators, Energy conversion), (*Electrochemistry, Energy conversion), (*Thermoelectricity, Energy conversion), Heat transfer, Fluid flow, Shock tubes, Electrodes, Oxidation, Hydrazine, Methanols, Chemisorption, Reaction kinetics

A brief summary is presented of the research conducted. Details of the work are reported in earlier reports. The scope of this program has included magnetogasdynamic, electrochemical, and thermoelectric studies. In addition to a summary of the research work, 22 technical papers and ten theses, generating from this work, are listed. (Author)

10/2. POWER SOURCES

AD-627 337 Fld. 10/2
CFSTI Prices: HC $3.00 MF $0.75
UNION CARBIDE CORP PARMA OHIO
MINIATURE HYDROGEN GENERATOR.
Quarterly rept. no. 1, 1 Jun-31 Aug 65,
by Jack E. Rothfleisch, and Lawrence M. Litz.
Jan 66, 64p. Contract DA-28-043-AMC-01375 (E) Proj. DA-1C6-22001-A-053 Task 1C6-22001-A-053-04
ECOM 01375-1
Unclassified report

Descriptors: (*Gas generating system, Hydrogen), (*Hydrogen, Fuel cells), (*Fuel cells, Gas generating systems), Fuel oils, Jet engine fuels, Oxidation, Pyrolysis, Gasoline

A mathematical analysis was made of the heat and mass balance relations in systems generating hydrogen from combat gasoline, JP-4 and diesel fuel. Processes considered were, (a) high and low pressure steam reforming, (b) high and low pressure partial oxidation, and (c) thermal cracking. In general, JP-4 and gasoline are preferred fuels over diesel fuel in terms of hydrogen generation. Fuel efficiency, based on engineering analysis of typical systems, favors the steam reformer system. Engineering complexity, particularly in terms of miniaturization requirements, indicates the thermal cracking approach may prove the most feasible for construction of miniature hydrogen generators in the range needed to provide hydrogen for 10-200 watt fuel cells. A laboratory thermal cracking apparatus was built and preliminary experiments run. Hydrogen yields up to 3.8 SCF per 100 ml. of JP-4 were obtained with a gas product of 93 per cent H2 and the balance methane. Reaction temperatures in excess of 1100C were required to give H2 concentrations above 85 per cent. Above 1000C, essentially no hydrocarbons other than methane were produced. Combat gasoline gave results similar to JP-4. (Author)

AD-627 606 Fld. 10/2
CFSTI Prices: HC $2.00 MF $0.50
UNION CARBIDE CORP PARMA OHIO RESEARCH LAB
THIN FUEL CELL ELECTRODES.
Quarterly progress rept. no. 2, 1 Aug-31 Oct 65,
by M. B. Clark, and K. V. Kordesch. 31 Oct 65, 41p. Rept. no. 6
Contract DA-28-043-AMC-01344 (E) Proj. DA-1C6-22001-A-053 Task 1C6-22001-A-053-04, 1C6-22001-A-053-05
Unclassified report

Continuation of Contract DA-36-039-AMC-02314 (E).

Descriptors: (*Fuel cells, Electrodes), (*Electrodes, Fuel cells), (*Batteries + components, Fuel cells), Hydrogen, Air, Tests, Test methods, Performance (Engineering), Water

Thin electrodes of established structure and performance characteristics determined in an electrode and single cell testing program have been built into batteries of a rated output of 100 watts (6.6 volts, 15 amperes). Construction features of the batteries are outlined, and the testing facilities and procedures are described. The performance of the first two (of the comtemplated 14) 100-watt batteries is described; initial polarization data are given, and the water balance achieved under varying operating conditions is discussed. (Author)

AD-628 024 See Fld. 20/9

10/3. ENERGY STORAGE

AD-627 931 Fld. 10/3
CFSTI Prices: HC $1.00 MF $0.50
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
HIGH-PRESSURE PERFORMANCE OF VOLTAIC CELLS.
Final technical rept. Jan-Feb 65,
by R. D. Hitchcock. Jan 66, 19p. Rept. no. TR-R-422
Proj. Y-R011-01-01-090
Unclassified report

Descriptors: (*Primary cells, High-pressure research), Underwater, Sea water, Test, Performance (Engineering), Theory, Oils, Magnesium, Copper, Lead, Inorganic acids, Underwater equipment

Measurements were taken on the open-circuit voltage of a magnesium-copper electrolytic couple immersed in seawater under pressures up to 18,000 psi. The cell voltage was not affected by pressure from a vacuum of 3 centimeters of mercury to a pressure of 18,000 psi. Measurements were also taken on the voltage of a lead-acid cell immersed in oil under pressures from atmospheric to 20,000 psi. Results indicate that cell performance is unaffected by pressure in this range. Two theories are discussed which attempt to explain the fact that the observed open-circuit voltage of the Mg - Cu cell is more than a volt below the voltage calculated from half-reaction potentials. One theory assumes that adsorbed H atoms alter the work function of the electrode; the other theory proposes that, when magnesium dissolves in water, equilibrium is too far on the side of complete reaction in one direction to allow measurement of the free energy of formation of the aqueous magnesium ion. (Author)

Field 11-MATERIALS

11/1. ADHESIVES AND SEALS

AD-627 540 Fld. 11/1
CFSTI Prices: HC $1.00 MF $0.50
UNITED STATES RUBBER CO WAYNE N J RESEARCH CENTER
STUDIES OF ADHESION BETWEEN OIL-RESISTANT RUBBERS AND FABRIC.
Interim technical rept. no. 1, 13 May-13 Nov 65,
by C. P. Roe, and R. W. Peer. Dec 65, 13p.
Contract DA-44-009-AMC-1068 (T) Task 5115
Unclassified report

Descriptors: (*Adhesives, Amino plastics), (*Synthetic rubber, Adhesives), (*Rubber adhesives, Nylon), Textiles, Nitrile rubber, Additives, Imides, Nitriles, Cyclooctane derivatives, Adhesion, Aging (Materials)

Both bis- and mono-maleimide chemicals have been studied as compounding ingredients in the types of rubber specified in the contract, namely, nitrile rubbers and neoprene. Adhesion levels of both types of rubber to nylon fabric were substandard, either green or aged. Work has been discontinued on maleimide chemicals as adhesives. Highly satisfactory adhesion levels of rubber to fabric have been obtained by use of a system depending on the chemistry of methylene donors and polyfunctional methylene acceptors. Bonds formed with this system showed satisfactory adhesion le-

vels both green and after extended immersion in water or a solvent mixture as specified in the contract. (Author)

AD-627 285 **See Fld. 6/12**

AD-627 319 **See Fld. 11/9**

11/2. CERAMICS, REFRACTORIES, AND GLASSES

AD-627 889 Fld. 11/2, 13/3
CFSTI Prices: HC $3.00 MF $0.75
OHIO RIVER DIV LABS CINCINNATI
RESPONSE OF FIBROUS-REINFORCED CONCRETE TO EXPLOSIVE LOADING.
Final technical rept.,
by G. R. Williamson. Jan 66, 79p. Rept. no. TR-2-48

Unclassified report

Descriptors: (*Reinforced concrete, Explosion effects), Impact shock, Loading (Mechanics), Detonations, Nylon, Fibers (Synthetic), Steel, Wire

The results of 72 explosive loading tests on fibrous-reinforced concrete slabs are presented. The slabs, 32x32x4 inches, were tested in a vertical position with 4 inches of bearing on the two vertical sides. A 10-pound cylindrical charge of Composition B high explosive was used as the loading mechanism. Various synthetic and steel fibres were used as random reinforcing to develop a concrete that would resist explosive loadings. Evaluation was based upon the ability of the fibrous concrete to reduce the amount and velocity of fragments produced by the explosive loading. The values obtained from tests of plain, unreinforced concrete slabs were used as the basis of comparison. It is shown that when plain concrete slabs are reinforced conventionally to resist the shear and flexural stresses, there is no reduction in fragment velocities or fragmentation; and, that similarly reinforced slabs of fibrous concrete show 20% reduction in velocities, and over 80% reduction in fragmentation. A study made to evalute high-strength and medium-strength concrete, when used in conjunction with fibres, revealed no significant difference in response under the explosive loading. The mode of failure for a slab supported on two sides only is shown to be primarily flexural. Detailed descriptions of each individual test are presented, together with conclusions and recommendations for future work. (Author)

AD-627 661 **See Fld. 13/13**

AD-627 664 **See Fld. 17/8**

AD-627 694 **See Fld. 11/5**

AD-628 005 **See Fld. 13/8**

11/3. COATINGS, COLORANTS, AND FINISHES

AD-627 311 Fld. 11/3, 14/4
CFSTI Prices: HC $2.00 MF $0.50
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
ELECTRICAL PROPERTIES OF COATING AS RELATED TO PERFORMANCE. I. EXPERIMENTS WITH FIVE IMMERSED COATING SYSTEMS,
by Peter J. Hearst. 21 Dec 65, 49p. Rept. no. TN-N-795
Proj. Y-F020-03-03-004

Unclassified report

Descriptors: (*Coatings, Performance (Engineering)), Electrical properties, Test methods, Steel, Liquid immersion test, Sea water, Alternating current, Experimental data

Five coating systems on steel panels were immersed in salt water for up to nearly two years. AC electrical properties of the coatings were determined and were compared with the performance of the coatings. There was appreciable correlation between electrical properties and performance. (Author)

AD-627 333 **See Fld. 20/6**

AD-627 366 **See Fld. 6/1**

AD-627 395 **See Fld. 11/8**

AD-627 822 **See Fld. 13/10**

AD-627 920 **See Fld. 13/9**

11/4. COMPOSITE MATERIALS

AD-627 519 Fld. 11/4, 13/1, 21/8, 14/2
CFSTI Prices: HC $2.00 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD NON-METALLIC MATERIALS DIV
HIGH TEMPERATURE RESISTANT MATERIALS FOR MISSILE PROPULSION SYSTEMS.
Annual summary rept. 30 Jun 64-30 Jun 65,
by B. T. Hartmann, F. J. Koubek, and D. M. Caum. 29 Nov 65, 35p. Task RMMP-23-054/212-1/F009-06-003
NOLTR 65-208

Unclassified report

See also AD-612 504.

Descriptors: (*Heat shields, Composite materials), (*High-temperature research, Materials), (*Rocket motors, Heat-resistant materials), (*Composite materials, Ablation), Heat-resistant plastics, Phenolic plastics, Nylon, Laminated plastics, Asbestors, Epoxy plastics, Glass textiles, Test methods, Thermal insulation, Plasma medium

Parametric studies were completed on methods for computing thickness of heat shield needed for a given set of conditions. For two very different materials, the studies showed that total insulation thickness needed is not sensitive to the exact value of the front-face temperature. Furthermore, whereas an average value of effective thermal diffusivity is sufficiently accurate for these calculations, the actual variation of heat flux with time must be used. One preliminary check of the above method against experimental data gave satisfactory agreement within 7%. A total of seven typical ablation materials was tested in the oxyacetylene burner using the alpha -rod technique. The results are in general agreement with previous arc image furnace data but are more precise, primarily due to the accuracy of the automatic feed device as compared with manual operation. Design work on the hi-pressure gas stabilized hi-intensity plasma arc head was almost completed. Most of the extensive auxiliary equipment has been obtained or requested. (Author)

AD-627 362 **See Fld. 11/9**

11/5. FIBERS AND TEXTILES

AD-627 694 Fld. 11/5, 11/2
CFSTI Prices: HC $5.00 MF $1.00
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
FIBER GLASS,
by A. G. Sorochishin. Dec 65, 174p. Rept. no. FSTC-381-T65-693
TT 66-60471

Unclassified report

Trans. of mono Stekloplastiki, Moscow 1964 p3-251.

Descriptors: (*Glass textiles, Manufacturing methods), Molding, Casting, Compressive properties, Materials, Binders, Reinforcing materials, Plastics, Mechanical properties, Construction, USSR

Contents: General information about fiber glass; Raw materials for the manufacture of fiber glass; Methods of manufacture of fiber glass and its use in construction; Physical technical properties of fiber glass; The use of fiber glass and structure based on it in construction.

AD-628 007 **See Fld. 7/5**

11/6. METALLURGY AND METALLOGRAPHY

AD-627 382 Fld. 11/6
CFSTI Prices: HC $3.00 MF $0.75
ARMY MATERIALS RESEARCH AGENCY WATERTOWN MASS
INFLUENCE OF TEST TEMPERATURE AND SOLUTE ADDITIONS ON THE PLASTIC FLOW AND STRAIN HARDENING OF ALPHA IRON,
by John Nunes. Sep 65, 69p. Rept. no. AMRA-TR-65-23
Proj. DA-1C024401A110

Unclassified report

Descriptors: (*Iron alloys, Mechanical properties), (*Creep, Iron alloys), (*Strain hardening, Iron alloys), Aluminum alloys, Cobalt alloys, Chromium alloys, Manganese alloys, Molybdenum alloys, Nickel alloys, Silicon alloys, Nanadium alloys, Temperature, Tensile properties, Stresses

The effects of such solute alloy additions as Al, Co, Cr, Mn, Mo, Ni, Si, and V on the plastic flow and strain-hardening properties of quasi-iron binary alloys were studied over a range of testing temperatures from +200 to -196 C. A pronounced inversion of the strength of alpha iron was noted for most of the alloys studied at the lower test temperatures and higher compositions. The principal exception to this behavior is noted for the Fe-Co and Fe-Cr alloys. Strength increases as a function of composition as seen at room temperature could be reasonably approximated by a straight line relationship. However, at the lower test temperatures this linear behavior was not observed. Except for Co, Cr, and V, which show no effect, the flow stress-temperature dependence of alpha iron alloys is shown to be strongly influenced by the amount and type of solute present. Finally, the strain-hardening behavior of iron, which is characterized by a marked transition of the strain-hardening exponent n between-40 and -80 C, is shown to be strongly influenced by the added solute, with Ni giving the greatest and Co, Cr, and V giving the least effect in this transition region. A possible hypothesis is offered to explain this behavior in terms of a basic change in the deformation behavior of iron, which is characterized by a decreased tendency for cell formation. (Author)

AD-627 575 Fld. 11/6
CFSTI Prices: HC $1.00 MF $0.50
ARMY MATERIALS RESEARCH AGENCY WATERTWON MASS MATERIALS ENGINEERING DIV
NOTCH STRENGTH OF HEAT-TREATED 4340 STEEL AS AFFECTED BY SUBSEQUENT COLD DRAWING AND AGING,
by Eugene DiCesare. Nov 65, 19p. Proj. DA-1C024401A110 Task 35831
AMRA TR-65-28

Unclassified report

Descriptors: (*Steel, Tensile properties), Heat treatment, Cold working, Drawing (Machine processing), Aging (Materials), Deformation, Martensite, Rods

The effects of cold drawing and of cold drawing and aging on the notch tensile strength of quenched and tempered 4340 rod was investigated. The rods were heat treated, reduced up to 40 percent by cold drawing, and aged at room temperature or at 400 F. Drawing was done at speeds of 10 to 40 feet per minute with a back-pull of 0 to

16,650 pounds. The notch tensile strength of the cold-drawn rods increased with increasing yield strength up to approximately 211,000 psi. This was followed by a decrease in the notch strength. The magnitude of the aging effect on the notch tensile strength was influenced by the tempering temperature and the drawing conditions. (Author)

AD-627 581 Fld. 11/6
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
A METALLOGRAPHIC STUDY OF SOLUTE SEGREGATION DURING CONTROLLED SOLIDIFICATION IN TIN-LEAD ALLOYS,
by H. Biloni, and G. F. Bolling. 3 Apr 63, 12p.
Contract AF49 (638)-1029 Proj. AF-9761 Task 976102
AFOSR 65-2034
Unclassified report

Availability: Published in Transactions of the Metallurgical Society of AIME, v227 p1351-60 Dec 1963. Copies to DDC users only.

Descriptors: (*Tin alloys, Metallography), Crystal growth, Lead alloys, Crystal substructure, Freezing, Microstructure, Surface properties

The microsegregation in tin specimens containing 0.2, 0.5, or 1 wt % Pb was studied in detail. The specimens were grown from the melt in a controlled fashion and exhibited a well-developed cellular substructure. In general, a severe microsegregation can be observed in all the photomicrographs presented. Some observations of special interest are: the distribution of a second phase, the presence of a eutectic in several forms, the evidence for diffusion of solute in the solid, and the enhancement of segregation at a dislocation subboundary network ('striations'). On the basis of the metallographic observations, it is deduced that the segregation observed is representative of the solute segregation produced during crystal growth. Some deductions are also made about the interplay of the 2 substructures, cells and striations, and about the mode of cellular growth. (Author)

AD-627 583 Fld. 11/6
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
A STABILITY FUNCTION FOR EXPLICIT EVALUATION OF THE MULLINS-SEKERKA INTERFACE STABILITY CRITERION,
by R. F. Sekera. 3 Aug 64, 7p. Contract AF49 (638)-1029 Proj. AF-9761 Task 976102
AFOSR 65-2036
Unclassified report

Availability: Published in Journal of Applied Physics, v36 n1 p264-8 Jan 1965. Copies to DDC users only.

Descriptors: (*Liquid metals, Freezing), (*Freezing, Alloys), (*Surface properties, Stability), Functions, Differential equations, Phase studies, Supercooling

In a previous paper by Mullins and Sekerka (Jour. Appl. Phys., v. 35: 444, 1964), a stability criterion was introduced for a planar solid-liquid interface during the unidirectional solidification of a dilute binary alloy at constant velocity. However, evaluation of the criterion proved difficult. In this paper, a stability function S for its evaluation is introduced and tabulated. The criterion is then written in terms of S and compared with the constitutional supercooling criterion for interface stability. From these results, experimental data can be analyzed and a conclusive test of the stability theory can be made.

AD-627 788 Fld. 11/6, 18/8
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA PA
THE EFFECT OF IRON VACANCIES ON THE DIFFUSION OF INTERSTITIAL CARBON IN FE-C ALLOYS,
by Arthur C. Damask, and Richard A. Arndt.
1964, 18p. Proj. DA-1C014501B11A
FA A64-32
Unclassified report

Prepared in cooperation with Brookhaven National Lab., Upton, N. Y.

Availability: Published in Reactivity of Solids, p238-48 1965. Copies to DDC users only.

Descriptors: (*Crystal lattice defects, Iron alloys), (*Iron alloys, Carbon alloys), (*Annealing, Iron alloys), Steel, Quenching (Cooling), Diffusion, Radiation damage, Chemical precipitation, Internal friction, Resistance (Electrical), Colorimetry, Electron microscopy

Excess carbon can be quenched into an interstitial solid solution in alpha-iron and, when the alloy is annealed at a lower temperature, the carbon will form an iron carbide precipitate in the iron matrix. Irradiation with neutrons of an alloy in which the solute is in interstitial positions can be expected to produce two major effects: (1) the severe local damage can create sites for nucleation of the precipitates, and (2) the lattice vacancies can serve as traps for the diffusing intersititial solute atoms and, thereby, retard precipitation of the solute. These two effects were studied in the carbon-iron system by a variety of experimental techniques - internal friction, electrical resistivity, electron microscopy, and colorimetry. The results of these studies are discussed. (Author)

AD-627 929 Fld. 11/6, 20/11, 13/10.1, 13/1
CFSTI Prices: HC $2.00 MF $0.50
NAVY MARINE ENGINEERING LAB ANNAPOLIS MD
LOW-CYCLE FATIGUE OF NONFERROUS ALLOYS FOR HEAT EXCHANGERS AND SALT-WATER PIPING)
Research and development rept. on phase 4,
by E. J. Czyryca, and M. R. Gross. Feb 66, 30p.
Rept. no. MEL-26/66
Proj. S-F020-01-02 Task 0225
Unclassified report

Descriptors: (*Corrosion-resistant alloys, Fatigue (Mechanics)), (*Bronze, Fatigue (Mechanics)), (*Heat exchangers, Corrosion-resistant alloys), (*Pipes, Corrosion-resistant alloys), Submarines, Sea water, Nickel alloys, Aluminum alloys, Copper alloys, Iron alloys, Manganese alloys, Castings, Welds, Flexural strength

The fourth phase of an investigation of the low-cycle fatigue behavior of nonferrous alloys for submarine heat exchanger and saltwater piping applications is reported. The low-cycle fatigue behavior of forged Ni-Al bronze and cast valve bronze was investigated in both air and salt water. The flexural fatigue behavior of these two materials, together with cast Ni-Al bronze and cast Monel 'E' of phase three, were compared to that predicted by Langer's equation. It was concluded that Langer's equation was overly conservative for the materials reported, and that saltwater corrosion has very little effect on low-cycle fatigue life. Both cast and forged Ni-Al bronze rank as superior, whereas valve bronze ranks poorly as far as low-cycle fatigue performance is concerned. (Author)

AD-627 977 Fld. 11/6, 14/2
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF ENGINEERING MECHANICS
DYNAMIC ANALYSIS OF METALLIC DEFORMATION BY TRANSMISSION ELECTRON MICROSCOPY,
by L. E. Murr. 1964, 16p. Contract AF-AFOSR-165-63
AFOSR 65-2476
Unclassified report

Availability: Published in Proceedings of the Pennsylvania Academy of Science v38 p126-43 1964. Copies to DDC users only.

Descriptors: (*Foils, Deformation), (*Electron microscopy, Foils), Test methods, Electron diffraction analysis, Fatigue (Mechanics), Impact shock, Loading (Mechanics), Fracture (Mechanics), Crystal lattice defects, Theory, Mathematical analysis, Metallography, Stainless steel

The paper describes techniques which enable thin metal foils to be deformed directly, and immediately observed in the electron microscope. The advantages of these dynamic testing methods are discussed, and typical observations of deformation as a result of fatigue, impact, and contact stressing are presented. Some consideration is also given to the theoretical interpretation of the imaging of defects by transmission electron microscopy. Selected area electron diffraction techniques are also employed to investigate the mechanism of contact stress fracture, which is directly observed in the electron microscope. (Author)

AD-628 039 Fld. 11/6
CFSTI Prices: HC $2.00 MF $0.50
SPRINGFIELD ARMORY MASS
INFLUENCE OF CRYSTALLOGRAPHIC AND METALLOGRAPHIC STRUCTURES ON DYNAMIC BEHAVIOR OF MATERIALS.
Technical rept.,
by John F. Panda, and Earl H. Abbe. 30 Nov 65, 41p. Rept. no. SA-TR18-1204
Proj. DA-M1-50006-01-M1-M6
Unclassified report

Descriptors: (*Stainless steel, Metallography), (*Titanium alloys, Metallography), Yield point, Strength, Loading (Mechanics), Impact shock, Cylindrical bodies, Pipes, Mechanical properties, Crystal structure, Microstructure, Test methods, Tensile properties

An investigation was conducted to determine the ratio of dynamic to static yield strengths of four metal alloys having different crystallographic and metallographic structures. Thick-wall cylindrical tube specimens were hydrostatically loaded at low and high rates of strain to obtain circumferential yielding. The ratios on the inside and on the outside diameters of the specimens for the four materials investigated were as follows: stainless steel (FCC), 1.03 and 1.005; 4340 steel (BCC), 1.06 and 1.09; alpha titanium (HCP), 1.12 and 1.09; beta titanium (BCC), 1.26 and 1.29. Test procedure is given and results are discussed. (Author)

AD-627 300 See Fld. 5/1

AD-627 518 See Fld. 13/10

AD-627 545 See Fld. 20/12

AD-627 652 See Fld. 20/11

AD-627 837 See Fld. 20/12

11/8. OILS, LUBRICANTS, AND HYDRAULIC FLUIDS

AD-627 345 Fld. 11/8, 13/9
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON DC
A NEW APPROACH TO LUBRICATING BALL BEARINGS.
Interim rept.,
by V. G. FitzSimmons, C. M. Murphy, J. B. Romansand , and C. R. Singleterry. 28 Dec 65, 25p.
Rept. no. NRL-6356
Task RRMA-03-021/652-1/R001-07-01 ,RREN-04-375/652-1/F008-01-05
Unclassified report

Descriptors: (*Lubricants, Ball bearings), (*Ball bearings, Lubrication), Servomotors, Synchros, Naval equipment, Creep, Esters, Silicones, Effectiveness, Films, Inhibition,

Failure (Mechanics), Life expectancy, Coatings, Fluorine compounds, Low-temperature lubricants

A study was undertaken of the causes of unsatisfactory service and storage life of Navy synchros and servo motors. Silicone oils have been in wide use as the lubricant for the ball bearings of these devices because of the good low-temperature characteristics of these materials. Examination of bearings from synchros which failed qualification tests gave evidence of fretting corrosion, broken bearing retainers, dry residues, and loss of lubricant. A white flocculent substance was found in new silicone-lubricated bearings. This substance could be reproduced in the laboratory at room temperature when rubbing ferrous metals were lubricated with silicones. The principal cause of early synchro and servo motor bearing failure is believed to be the creeping away of the small supply of silicone lubricant from the load-carrying area of the bearings under service and storage conditions. Studies proved that a lubricant based on bis (2-ethylhexyl)azelate satisfactorily lubricated synchro bearings at temperatures as low as -55C. Creeping of lubricants composed either of the azelate ester or of silicones from ball bearings was prevented by the use of lowenergy fluorochemical barrier films. The life of synchros containing bearings treated with the barrier film and lubricated with a bis (2-ethylhexy)azelate composition has increased from 300 hours to nearly 4000 hours on standard qualification tests.

AD-627 395 Fld. 11/8, 13/8, 11/3, 11/9
CFSTI Prices: HC $1.00 MF $0.50
ARMY WEAPONS COMMAND ROCK ISLAND ILL RESEARCH AND ENGINEERING DIV
FACTORS INFLUENCING CORROSION PROTECTION PROVIDED BY SOLID FILM LUBRICANT COATINGS.
Technical rept.,
by George P. Murphy, and Francis S. Meade.
Dec 65, 25p. Proj. DA-1C024401A107
RIA 65-3380

Unclassified report

Descriptors: (*Lubricants, Corrosion inhibition), (*Corrosion inhibition, Lubricants), Solids, Films, Coatings, Thickness, Friction, Wear resistance, Polyvinyl chloride, Life expectancy, Salt spray tests, Performance (Engineering)

This investigation included the effect of (1) resin-pigment ratio, (2) coating thickness, and (3) wearing away of the film on the corrosion protection provided by solid lubricant coatings. Two series of solid film lubricants of various resin-pigment ratios were made using good and poor pigment dispersion techniques. These series of solid film lubricants were evaluated at several levels of coating thickness. Corrosion protection was evaluated by means of 20% Salt Fog cabinet while wear life was determined by the Falex Wear Test method. A combination friction-salt fog test was used in determining the effect of wearing away of the film on corrosion resistance. It was found that a solid film lubricant can be manufactured, using good pigment dispersion techniques, which will provide 1000 hours of salt fog protection. This lubricant showed no loss in wear life. It was also found that, by using a 0.0010 in. coating made up of two layers, salt fog life can be increased by at least 6 fold without sacrificing wear life. (Author)

AD-627 578 Fld. 11/8
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF
LUBRICANTS FOR THE SPACE ENVIRONMENT,
by Francis J. Clauss. 1965, 4p.

Unclassified report

Prepared for presentation at Western Metal Congress, Los Angeles, 25 Feb 65.

Availability: Published in Metals Engineering Quarterly p58-61 Nov 1965. Copies to DDC users only.

Descriptors: (*Lubricants, Space environmental conditions), Radiation damage, Vacuum, Performance (Engineering), Spacecraft

The selection of a lubricant depends upon both the performance requirements of the specific application on which it is to be used and upon the environment in which it must function. Elements of the space environment in which lubricants can be called upon to function include, for example, ultrahigh vacuum, radiation, and zero gravity. Typical applications include bearings, gears, and sliding contacts, which can be further classified according to their loads, speeds, temperatures, sizes, and lifetimes. The usefulness of various types of lubricants (e.g., oils, greases, and molybdenum disulfide films) in some of these applications and environments will be discussed. (Author)

AD-627 823 **See Fld. 9/1**

AD-627 856 **See Fld. 7/4**

AD-627 930 **See Fld. 18/4**

11/9. PLASTICS

AD-627 319 Fld. 11/9, 7/3, 11/1
CFSTI Prices: HC $1.00 MF $0.50
PICATINNY ARSENAL DOVER N J PLASTICS AND PACKAGING LAB
PREPARATION OF POLYSILANES AND POLYSILARYLENES,
by E. A. Hoess, and E. L. O'Brien. Feb 66, 17p.
Proj. DA-1C024401A110
PA TR-3289

Unclassified report

Descriptors: (*Silicone plastics, Preparation), (*Silanes, Synthesis (Chemistry)), (*Heat-resistant plastics, Silanes), Aromatic compounds, Silicon compounds, Condensation reactions, Copolymerization, Adhesives

The overall objective of the program is to prepare polymers which can serve as thermally stable structural adhesives or resins at service temperatures up to 538C (1000F). The report covers a portion of the work done on the synthesis of compounds containing Si-Si and Si-phenyl bonds. Dodecaphenylcyclohexansilane, polysilphenylene, and polysilbiphenylene were prepared by the Wurtz-Fittig reaction. These molecules were identified and characterized. (Author)

AD-627 362 Fld. 11/9, 11/4, 1/3
CFSTI Prices: HC $3.00 MF $0.75
OKLAHOMA UNIV RESEARCH INST NORMAN
THE EFFECT OF RESIN CONTENT AND VOIDS ON THE STRENGTH OF FIBERGLASS-REINFORCED PLASTICS FOR AIRFRAME USE.
Final rept.,
by Gene M. Nordby, W. C. Crisman, and Charles W.Bert. Nov 65, 99p. Contract DA-44-177-AMC-164(T) Task 1P121401A4176
USAAVLABS TR-65-66

Unclassified report

Descriptors: (*Composite materials, Airframes), (*Epoxy plastics, Glass textiles), (*Glass textiles, Reinforcing materials), Laminated plastics, Defects (Materials), Non-destructive testing, Aging (Materials), Compressive properties, Tensile properties, Deflection, Bending, Fracture (Mechanics)

As a further step toward the acceptance of fiberglassreinforced plastics (FRP) in primary aircraft structure, the effects of resin content on laminate strength properties were investigated in depth. Functional relationships were obtained and methods of controlling resin content were compared. Uniformity in strength and resin content was observed from the point of view of replication and within-laminate conditions. Most of the data were for laminates of EPON 828-Z epoxy resin reinforced with the 181 style fiberglass fabric; however, limited data were obtained for the 120 and 909 (S-920) fabrics. In addition, a preliminary study was made of the effects of voids in the cured laminates. A critical size was observed for large artificial voids, and the microvoid content of the prepreg was minimized by modification of a previously developed multi-ply coating machine. Non-destructive methods of testing for voids were also reviewed. (Author)

AD-627 639 Fld. 11/9, 7/3
CFSTI Prices: HC $2.00 MF $0.50
MALLINCKRODT CHEMICAL LAB HARVARD UNIV CAMBRIDGE MASS
NEW METHODS FOR PREPARING SILICON-NITROGEN POLYMERS.
Technical rept.,
by Walter E. Weibrecht, and Eugene G. Rochow.
Oct 65, 38p. Contract SD-88
ARPA 14

Unclassified report

Descriptors: (*Heat-resistant plastics, Preparation), (*Silicon compounds, Polymerization), (*Nitrogen compounds, Polymerization), Silanes, Ammonium compounds, Chlorine compounds, Condensation reactions, Spectra (Infrared), Nuclear magnetic resonance

One project involved the reaction, dimethyldichlorosilane with ammonium halides as sources of nitrogen. When these experiments showed little or no interaction, ammonolysis of dimethyldichlorosilane at 200 in the presence of ammonium bromide was tried. Octamethylcyclotetrasilazane was obtained, together with some liquid polymer which was of the same cross-linked character as that obtained by Kruger's sequential ammonolysis and catalytic polymerization. No larger proportion of linear dimethylsilazane resulted, hence, there is no advantage to the procedure. A second project, sym-dimethoxytetramethyldisiazane and the corresponding tri and tetrasilazanes were prepared by the reaction of dimethyldichlorosilane with methanol, followed by treatment with anhydrous ammonia. The infrared and NMR spectra of these compounds were examined. Prolonged heating of the disilazane in the presence of sodium methoxide, aluminum methoxide and isopropoxide, and potassium tertiarybutoxide led to the formation of low-molecular-weight linear silicon-nitrogen polymers, as well as to some other silicon-nitrogen substances of a more complicated nature. (Author)

AD-627 640 Fld. 11/9, 7/3
CFSTI Prices: HC $2.00 MF $0.50
MALLINCKRODT CHEMICAL LAB HARVARD UNIV CAMBRIDGE MASS
SILAZANE POLYMERS.
Technical rept.,
by George Redl. Oct 65, 50p. Contract SD-88
ARPA 19

Unclassified report

Descriptors: (*Silicon compounds, Polymerization), (*Nitrogen compounds, Polymerization), (*Heat-resistant plastice, Preparation), Condensation reactions, Reaction kinetics, Ammonia, Chemical equilibrium, Chemical analysis, Nuclear magnetic resonance, Spectra (Infrared), Molecular weight, Silanes, Polymers

A study of the kinetics and mechanisms of the Kruger condensation of dimethylsilazane revealed that the evolution of ammonia which brings about the crosslinking could be suppressed by conducting the reaction under a pressure of ammonia. In fact, polymerization of cyclic dimethylsilazane could be accomplished by heating the silazane under ammonia pressure alone, without any Kruger catalyst. An equilibrium mixture resulted, from which a low yield of linear polymer was isolated.

Elemental analysis, NMR spectra, and infrared absorption spectra all prove that this product is indeed linear polymer composed of a multiplicity of (CH3)2Si-NHunits. The process is described, and variations of it are reported. Methods for improving the yield and for increasing the molecular weight now are being sought. (Author)

AD-628 008 Fld. 11/9
CFSTI Prices: HC $5.00 MF $1.00
DEPARTMENT OF THE NAVY WASHINGTON D C
EPOXY COMPOUNDS AND THEIR APPLICATION,
by K. I. Chernyak. 1958, 194p. Rept. no. Translation-775
TT 66-60504
Unclassified report

Trans. of Unidentified Russian mono., Leningrad 1959.

Descriptors: (*Epoxy plastics, Reviews), Industrial production, Aging (Materials), Plasticizers, Additives, Hardening, Physical properties, Chemical properties, Mechanical properties, Electrical properties, Electrical insulation, Expanded plastics, Synthetic rubber, Adhesives, Safety, USSR

Contents: Epoxy resins and hardeners, (technology of production, basic characteristics of dianin resin, hardening agents, methods of determination of the vitality of the epoxy compounds); Epoxy compounds, (classification, plasticizers and fillers, characteristics of the process of hardening, recipes for epoxy compounds and some of their peculiarities); Properties of epoxy compounds, (physicochemical, mechanical, and electrical properties, epoxy compounds as heat-stable electrical insulation); Some varieties of epoxy compounds, (epoxy -thioko compound, foam epoxys, glues); Preparation and utilization of epoxy compounds, (technology of preparation and utilization, safety techniques, several methods of utilizing epoxy compounds).

AD-627 308 **See Fld. 11/10**

AD-627 395 **See Fld. 11/8**

AD-627 803 **See Fld. 13/10**

AD-628 007 **See Fld. 7/5**

11/10. RUBBERS

AD-627 308 Fld. 11/10, 11/9, 7/3
CFSTI Prices: HC $1.00 MF $0.50
ARMY WEAPONS COMMAND ROCK ISLAND ILL RESEARCH AND ENGINEERING DIV
SYNTHESIS OF ELASTOMERS FROM EPOXIDES.
Technical rept.,
by Elmer I. Spearman. Dec 65, 16p. Proj. DA-1C014501B13A
R1A 65-3417
Unclassified report

Descriptors: (*Elastomers, Synthesis (Chemistry)), (*Epoxy plastics, Elastomers), Polymers, Vulcanizates, Physical properties

Elastomeric oxypropylene terpolymers and copolymers which are resistant to petroleum base oils and flexible at low temperatures were synthesized using a ferric chloride-propylene oxide-water complex catalyst. Terpolymers of propylene oxide (PO)-allyl glycidyl ether (AGE)-polar monoepoxides varied from viscous liquids to rubbery solids. In general, their inherent viscosity increased as the polar monoepoxide concentration decreased. With PO-AGE based vulcanizates, improved tensile strength and elongation were obtained as the concentration of PO was increased. Vulcanizates based on 90% PO-8% AGE and 2% epichlorohydrin (EC1H) swelled 55% after immersion for 70 hours at 212F. in ASTM No. 3 oil and were non brittle at -40C. High molecular weight terpolymers of PO-AGE-diepoxides were prepared. Unsaturated polar compounds (i.e. allyl cyanide, allyl sulfide) did not form terpolymers with PO-AGE. (Author)

AD-628 001 Fld. 11/10
CFSTI Prices: HC $2.00 MF $0.50
MONSANTO RESEARCH CORP DAYTON OHIO
PHYSICAL AND RHEOLOGICAL PROPERTIES OF NITROSO RUBBERS.
Quarterly rept. no. 7, 25 Dec 64-24 Mar 65,
by G. L. Ball,III, H. S. Wilson, I. O. Salyer, and J. V. Pustinger. 24 Mar 65, 31p. Contract DA-19-129-AMC-151 (N)
Unclassified report

Descriptors: (*Heat-resistant materials, Synthetic rubber), (*Synthetic rubber, Physical properties), Rheology, Thermal expansion, Phase studies, Transition temperature, Chemical analysis, Solvents, Polymers, Spectrum (Infrared), Nuclear magnetic resonance, Viscosity, X-ray diffraction analysis, Differential thermal analysis, Thermogravimetric analysis, Fluorine compounds

Several nitroso gums were partially characterized. Linear expansion coefficients of a typical nitroso gum were determined to be 0.000076 from -72C up to the glass transition with the glass transition at -49C. Density of the nitroso gum as received was 1.937 plus or minus 1 g/cc. A simple 'finger printing' technique utilizing Vicat softening temperatures was devised. A typical Vicat temperature was -40C. Volatile products representing up to 29 percent of the nitroso gum were collected. The products consisted of yet unidentified solvents and lower molecular weight portions. Atypicality (percent deviation from theoretical) was determined for the various gums. Atypicality varied from plus or minus 0.5% to plus or minus 4.0%. A change in typicality of the nitroso gum occurred with time and removal of the volatile product indicating loss of solvent and polymer constituent. Two CF3NO/C2F4/C2F3H terpolymers were examined. (Author)

AD-628 002 Fld. 11/10
CFSTI Prices: HC $2.00 MF $0.50
MONSANTO RESEARCH CORP DAYTON OHIO
PHYSICAL AND RHEOLOGICAL PROPERTIES OF NITROSO RUBBERS.
Quarterly rept. no. 8, 25 Mar-24 Jun 65,
by G. L. Ball,III, I. O. Salyer, J. V. Pustinger, and F. N. Hodgson. 15 Jul 65, 41p. Contract DA-19-129-AMC-151 (N)
Unclassified report

See also AD-628 001.

Descriptors: (*Heat-resistant materials, Synthetic rubber), (*Synthetic rubber, Physical properties), Fluorine compounds, Molecular weight, Rheology, Solvents, Phase studies, Transition temperature, Aging (Materials), Decomposition, Thermogravimetric analysis, Mass spectrum, Solvent extraction

Characterization of a trifluoronitrosomethane/tetrafluoroethylene copolymer was continued. The previously reported 'volatile' portion of the fluoronitroso gums was identified as purely low molecular weight fractions. No other contaminants were found. Removal of this low molecular weight portion was demonstrated by solvent precipitation and vacuum drying techniques. The low molecular weight portion boils predominately in the 100C region and is present up to 200C. Except for average molecular weight no differences were noted between the present Thiokol gums and the earlier 3M gum. A usable solvent/non solvent system consisting of FC-75 and benzotrifluoride was determined and the useful solvent ratios and temperatures set. The 1000 cycle per second glass transition was determined to be -18C. Amine cure of the Thiokol gum following a recommended procedure provided poor rubber specimens. Violent decomposition of the cured rubber occured at 270C as had the gum. (Author)

AD-628 003 Fld. 11/10
CFSTI Prices: HC $2.00 MF $0.50
MONSANTO RESEARCH CORP DAYTON OHIO
PHYSICAL AND RHEOLOGICAL PROPERTIES OF NITROSO RUBBERS.
Quarterly rept. no. 9, 25 Jun-24 Sep 65,
by G. L. Ball,III, I. O. Salyer, and J. V. Pustinger. 12 Oct 65, 28p. Contract DA-19-129-AMC-151 (N)
Unclassified report

See also AD-628 002.

Descriptors: (*Heat-resistant materials, Synthetic rubber), (*Synthetic rubber, Physical properties), Rheology, Fluorine compounds, Molecular weight, Light, Scattering, Mechanical properties, Aging (Materials), Additives, Carbon black, Tensile properties, Hardness, Modulus of elasticity, Chemical analysis

Characterization of a trifluoronitrosomethane/tetrafluoroethylene copolymer was continued. The molecular weight (light scattering) of a gum rubber fraction was determined to be 484,000 when examined in the perfluorocyclic ether solvent. Previous determinations on gums in perfluorotributylamine and Freon 113 indicated a molecular weight of 400,000 and 200,000, respectively. Respective intrinsic viscosities were 0.44, 0.41 and 0.18. Mold cure plus a stepped post-cure was found necessary in order to obtain adequately vulcanized samples. One part of carbon black in an amine-cured, SiO2-filled nitroso rubber increased strength and hardness to produce a rubber of 267 psi strength, 420% elongation and 47 Shore A hardness units. Dynamic modulus measurements indicate a utility for the rubber well below -75C. A white precipitate found in earlier gums was not conclusively identified except that it was shown to be chemically different from the typical nitroso gum. (Author)

AD-628 007 **See Fld. 7/5**

11/11. SOLVENTS, CLEANERS AND ABRASIVES

AD-627 856 **See Fld. 7/4**

Field 12-MATHEMATICAL SCIENCES

12/1. MATHEMATICS AND STATISTICS

AD-627 379 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
BALLISTIC RESEARCH LABS ABERDEEN PROVING GROUND MD
PRIMALITY OF A CERTAIN CLASS OF INTEGERS,
by Lynn S. Mohler. Aug 65, 23p. Rept. no. BRL-1300
Proj. 1P014501A14B
Unclassified report

Descriptors: (*Prime numbers, Number theory), (*Number theory, Prime numbers), Programming (Computers)

This report is concerned with determining the primeness of the members of a class of numbers of the form, B sub p = 2 to the pth power + 1/3, where p is an odd prime. This class is similar to the Mersenne and Fermat numbers. A theorem is proven which characterizes the factors of B sub p. This study was conducted using BRLESC, the high-speed digital computer at BRL and a descrip-

tion is given of the program used. Finally, the B sub p's that were found to be prime as well as the B sub p's that were found to be composite are tabulated. (Author)

AD-627 445 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT STATION
ON THE REPRESENTATION OF THE NUMBERS 1,2,..., N BY MEANS OF DIFFERENCES,
by L. Redei, and A. Renyi. Sep 65, 11p. Rept. no. G-T-R-65-7
Contract AF19 (628)-5034
Unclassified report

Trans. of Matematicheskii Sbornik (USSR) v24 (66) p385-9 1949.

Descriptors: (*Number theory, Difference equations), Inequalities, USSR

AD-627 547 Fld. 12/1
ERLANGEN UNIV (GERMANY)
MAXIMALE HOLOMORPHE UND MEROMORPHE ABBILDUNGEN, II (MAXIMAL HOLOMORPHIC AND MEROMORPHIC REPRESENTATION, II,),
by Von Karl Stein. 5 Mar 64, 50p. Contract AF-EOAR-62-40 Proj. AF-9749 Task 974902
AFOSR 65-2972
Unclassified report

Availability: Published in American Journal of Mathematics v85 n4 p823-68 Oct 1964. Copies to DDC users only.

Descriptors: (*Functions, Complex variables), Optimization, Rings (Mathematics), Groups (Mathematics), Mapping (Transformations), West Germany

AD-627 550 Fld. 12/1
PISA UNIV (ITALY)
METODI ANALITICI PER VARIETA ABELIANE IN CARATTERISTICA POSITIVA. CAPITOLI 1, 2. (ANALYTIC METHODS FOR ABELIAN VARIETIES OF POSITIVE CHARACTERISTIC. PARTS 1, 2),
by Iacopo Barsotti. 17 Jul 63, 28p. Contract AF-EOAR-29-63 ,NSF-G-15983
AFOSR 65-2731
Unclassified report

Availability: Published in Estratto Dagli Annali della Scuola Normale Superiore di Pisa, v18 n3 p1-25 1964. Copies to DDC users only.

Descriptors: (*Algebraic geometry, Theory), Algebraic topology, Vector analysis, Italy

This paper is devoted to an extension of the theory of Witt vectors. First Cov R (the Witt convectors) is introduced as the set of sequences from R satisfying a suitable convergence condition. Like the Witt vectors, they are added by certain universal formulas for the components, and there are natural operators on them. Cov R is a topological (Vect k)-module. The bivectors are then defined as those sequences for which (...x sub n) is a convector for all n. They form a topological group which is completable to Biv R. This last is a complete topological ting, as well as a topological (Vect KR)module. Finally, the topology in R permits the introduction of analysis--the exponential, logarithmic and Artin-Hasse exponential series are introduced and briefly studied. (Author)

AD-627 623 Fld. 12/1, 20/8
BOSTON UNIV MASS DEPT OF PHYSICS
A SHARPENING OF O'RAIFERTAIGH'S THEOREM,
by P. Roman, and C. J. Koh. 6 Aug 65, 4p. Contract AF-AFOSR-385-63 Proj. AF-9751 Task 975101
AFOSR 65-2800
Unclassified report

Availability: Published in Il Nuovo Cimento (Ser10) v39 p1015-6 1965. Copies to DDC users only.

Descriptors: (*Theorems, Groups (Mathematics)), (*Groups (Mathematics), Theorems), Functional analysis, Operators (Mathematics), Elementary particles, Field theory

Proof is given of the theorem that: In any irreducible representation of a group G, the operator P (2) cannot have more than one eigenvalve.

AD-627 626 Fld. 12/1
CHICAGO UNIV ILL
AUTONOMOUS CATEGORIES AND DUALITY OF FUNCTORS,
by F. E. J. Linton. 28 Sep 64, 36p. Contract AF-AFOSR-520-64 ,NSF-GP-2432
AFOSR 65-2645
Unclassified report

Availability: Published in Journal of Algebra v2 n3 p315-49 Sep 1965. Copies to DDC users only.

Descriptors: (*Set theory, Functional analysis), (*Functional analysis, Mapping (Transformations)), Algebra, Transformations (Mathematics), Topology

AD-627 630 Fld. 12/1
CALIFORNIA UNIV SANTA BARBARA DEPT OF MATHEMATICS
UNIMODULAR GROUP MATRICES WITH RATIONAL INTEGERS AS ELEMENTS,
by R. C. Thompson. 20 Aug 63, 9p. Contract AF-AFOSR-698-65 Proj. AF-9749 Task 974901
AFOSR 65-2068
Unclassified report

Availability: Published in Pacific Journal of Mathematics v14 n2 p719-26. Copies to DDC users only.

Descriptors: (*Matrix algebra, Groups (Mathematics)), (*Groups (Mathematics), Matrix algebra), (*Rational numbers, Matrix algebra, Permutations, Theorems

The following theorem is proved: For a finite solvable group G, A is a unimodular matrix of rational integers such that B = AA' is a group matrix for G. Then A = A sub 1 T where A sub 1 is a unimodular group matrix of rational integers for G and T is a generalized permutation matrix. The left regular representation of G is defined by the matrix equations: (gg sub 1, gg sub 2, gg sub n) = (g sub 1, g sub 2, ..., g sub n) P (L) (g) where g sub 1, g sub 2, ..., g sub n are ordered elements of G and g E G. The right regular representation is similarly defined. Their group rings, the set of all linear combinations of P (L) (g) and P (R) (g), are denoted L* (G) and R* (G). It is noted that matrices in L* (G) and R* (G) commute, and a matrix that commutes with any P (R) (g) is a member of L* (G). These facts are used in an inductive proof on an ordered, ascending chain of subgroups of G to obtain the theorem. (Author)

AD-627 631 Fld. 12/1
CALIFORNIA UNIV SANTA BARBARA DEPT OF MATHEMATICS
MATRIX RATIONAL COMPLETIONS SATISFYING GENERALIZED INCIDENCE EQUATIONS.
Revised ed.,
by Eugene C. Johnsen. 17 Mar 64, 13p. Contract AF-AFOSR-698-65 Proj. AF-9749 Task 974901
AFOSR 65-2069
Unclassified report

Prepared in cooperation with Ohio State Univ., Columbus.

Availability: Published in Canadian Journal of Mathematics, v17 p1-12 1965. Copies to DDC users only.

Descriptors: (*Matrix algebra, Combinatorial analysis), (*Combinatorial analysis, Matrix algebra), Equations

AD-627 643 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
THE DECISION METHOD FOR REAL ALGEBRA: IS IT PRACTICAL.
by Joel Friedman. Jan 66, 50p. Rept. no. RM-4436-PR
Contract AF49 (628)-1700
Unclassified report

Descriptors: (*Algebra, Real numbers), (*Decision theory, Algebra), Feasibility studies, Mathematical logic, Metamathematics

This memorandum deals with the practicality of Tarski's decision procedure for the mathematical theory of Real Algebra. The procedure is presented in a modified form. It is reduced to three basic methods. Each method processes a basic kind of formula of Real Algebra. The efficiency of each of these methods is discussed. Finally, an alternative to the third method, invented by Hamblin, is presented. Its efficiency is also discussed. For each of these methods, only a partial measure of efficiency is offered. This partial measure is itself not determined exactly, but rather to within certain bounds. The general impracticality of both the third method and its alternative is then inferred from this partial measure of efficiency. Hence the general impracticality of the whole decision procedure follows. (Author)

AD-627 682 Fld. 12/1, 9/2
CFSTI Prices: HC $3.00 MF $0.75
MICHIGAN UNIV ANN ARBOR COLL OF LITERATURE SCIENCE AND THE ARTS
HOMOMORPHISMS OF GRAPHS.
Technical rept.,
by Stephen Hedetniemi. Dec 65, 81p. Rept. no. ORA-03105-42-T
Contract Nonr-1224 (21) ,DA-ARO (D)-31-124-G665 Proj. ORA-03105 ,ORA-07363
Unclassified report

Descriptors: (*Mapping (Transformations), Graphics), (*Topology, Computer logic), Automata, Algebraic topology, Groups (Mathematics)

The works of Hartmanis and Stearns, Krohn and Rhodes, Yoeli and Ginzburg, and Zeiger amply demonstrate the usefulness of homomorphisms in studying decompositions of finite automata. Yoeli and Ginzburg's approach is slightly different from the tohers in that it is more concerned with aspects of the state transition graphs of finite automata. In their paper, 'On Homomorphic Images of Transition Graphs,' they give a complete characterization of the class of homomorphisms of the graphs which correspond to input-free automata. This paper was motivated by an interest in extending these results of Yoeli and Ginzburg in the direction of a characterization of the class of homomorphisms of graphs which correspond to arbitrary finite automata. It is a review and a classification of most of the published definitions and results on mappings of graphs which have been called homomorphisms. The paper contains, in addition, several new results and several new definitions of homomorphisms of graphs. (Author)

AD-627 685 Fld. 12/1
MISSOURI UNIV COLUMBIA
ON THE CONVERGENCE RATE OF THE LAW OF LARGE NUMBERS FOR LINEAR COMBINATIONS OF INDEPENDENT RANDOM VARIABLES.
Revised ed.,
by D. L. Hanson, and L. H. Koopmans. 15 Nov 64, 6p.
AFOSR 65-2074
Unclassified report

Availability: Published in The Annals of Mathematical Statistics, v36 n2 p559-64 Apr 1965. Copies to DDC users only.

Descriptors: (*Number theory, Stochastic processes), (*Stochastic processes, Combinatorial analysis), (*Combinatorial analysis, Stochastic processes), Sequences, Real numbers

AD-627 697 Fld. 12/1, 20/11
CFSTI Prices: HC $2.00 MF $0.50
TECHNION - ISRAEL INST OF TECH HAIFA DEPT OF MECHANICS
THE PHYSICAL TENSOR, ANALYSIS AND APPLICATIONS.
Final scientific rept.,
by Z. Karni. 30 Nov 65, 35p. Contract AF-EOAR-71-64 Proj. AF-9749 Task 974901
AFOSR 65-2758

Unclassified report

Descriptors: (*Invariance, Tensor analysis), (*Tensor analysis, Invariance), Operators (Mathematics), Differential equations, Mechanics

The introduction of the physical tensor permits the extension of the concept of the scalar invariant of a tensor to that of tensor invariants, themselves tensors of arbitrary order. The fundamentals of the invariant theory of the physical tensor are sketched out, later applied to the invariant differential operators and the generalized relations existing between differential invariants, formed from the first and second tensor derivatives of a field vector and of a second-order tensor. (Author)

AD-627 732 Fld. 12/1
PISA UNIV (ITALY)
THE SPACES L (P,LAMBDA), N (P,LAMBDA) AND INTERPOLATION,
by Guido Stampacchia. 14 Jun 65, 22p. Contract AF-EOAR-42-65 Proj. AF-9749 Task 974902
AFOSR 65-2643

Unclassified report

Availability: Published in Annali Della Scuola Normale Superiore di Pisa, v19 n3 p443-62 1965.

Descriptors: (*Functional analysis, Approximation (Mathematics)), Theorems, Real numbers, Italy

An interpolation theorem in the given spaces is proved. Applications to the Morrey spaces and to the Holder continuous functions are given.

AD-627 750 Fld. 12/1
CALIFORNIA UNIV LOS ANGELES
APPROXIMATION BY GENERALIZED RATIONAL FUNCTIONS,
by E. W. Cheney. 1964, 10p. Contract AF-AFOSR-77-63
AFOSR 65-2428

Unclassified report

Availability: Published in Approximation of Functions p101-10 1965. Copies to DDC users only.

Descriptors: (*Approximation (Mathematics), Functions), (*Functions, Approximation (Mathematics)), Theorems, Functional analysis, Operators (Mathematics)

AD-627 767 Fld. 12/1
PISA UNIV (ITALY)
PROPRIETA DI UNA FAMIGLIA DI SPAZI FUNZIONALI (PROPERTIES OF A FAMILY OF FUNCTIONAL SPACES),
by S. Campanato. 1964, 25p. Contract AF-EOAR-29-63 Proj. AF-9749 Task 974902
AFOSR 65-2733

Unclassified report

Availability: Published in Estratto Dagli Annali della Scuola Normale Superiore di Pisa (Ser3) v18 pt1 p137-60 1964. Copies to DDC users only.

Descriptors: (*Functional analysis, Theory), Italy

AD-627 768 Fld. 12/1
PISA UNIV (ITALY)
TEOREMI DI INTERPOLAZIONE PER TRASFORMAZIONI CHE APPLICANO LP IN CH,A (THEOREMS ON THE INTERPOLATION OF TRANSFORMATIONS OF I (P)IN C (H,A),
by S. Campanato. 1964, 17p. Contract AF-EOAR-29-63 Proj. AF-9749 Task 974902
AFOSR 65-2732

Unclassified report

Availability: Published in Estratto Annali della Scuola Normale Superiore di Pisa (Ser3) v18 pt3 p345-60 1964. Copies to DDC users only.

Descriptors: (*Theorems, Functional analysis), (*Functional analysis, Transformations (Mathematics)), Approximation (Mathematics), Integral transforms, Italy

AD-627 769 Fld. 12/1
TRIESTE UNIV (ITALY)
UN'APPLICAZIONE DELLA TEORIA DEGLI INTEGRALI SINGOLARI ALLO STUDIO DELLE EQUAZIONI DIFFERENZIALI LINEARI ASTRATTE DEL PRIMO ORDINE (AN APPLICATION OF THE THEORY OF ANY SINGLE INTEGRAL TO THE STUDY OF LINEAR DIFFERENTIAL EQUATIONS OF THE FIRST ORDER),
by Luciano de Simon. 7 Nov 63, 20p. Contract AF-EOAR-62-7
AFOSR 65-2436

Unclassified report

Availability: Published in Rendiconti del Seminarie Matematico della Universita di Padova v34 p205-23 1964. Copies to DDC users only.

Descriptors: (*Differential equations, Integrals), (*Integrals, Differential equations), Functional analysis, Italy

AD-627 770 Fld. 12/1, 20/11
MINNESOTA UNIV MINNEAPOLIS DEPT OF MATHEMATICS
THE BEHAVIOR OF INCREASING STABLE PROCESSES FOR BOTH SMALL AND LARGE TIMES,
by Bert Fristedt. 1964, 11p. Contract AF-AFOSR-62-252
AFOSR 65-2642

Unclassified report

Availability: Published in Journal of Mathematics and Mechanics v13 n5 p849-56 Sep 1964. Copies to DDC users only.

Descriptors: (*Statistical processes, Statistical functions), Stability, Probability, Statistical tests

This paper is concerned with the sample functions of increasing stable processes having no deterministic linear component.

AD-627 786 Fld. 12/1
SYRACUSE UNIV N Y
RUSSIAN LITERATURE ON APPROXIMATION IN 1958-1964,
by G. G. Lorentz. 1964, 25p. Contract AF49 (638)-1401
AFOSR 65-2658

Unclassified report

Availability: Published in Approximation of Functions, p191-215 1965. Copies to DDC users only.

Descriptors: (*Bibliographies, Approximation (Mathematics)), (*Approximation (Mathematics), Bibliographies), USSR, Functional analysis, Polynomials, Numerical analysis

AD-627 834 Fld. 12/1
MINNESOTA UNIV MINNEAPOLIS DEPT OF MATHEMATICS
AN EXPLICIT INVERSION FORMULA FOR FINITE-SECTION WIENER-HOPF OPERATORS,
by Glen Baxter, and I. I. Hirschman,Jr.. 14 Jul 64, 7p. Contract AF-AFOSR-381-63
AFOSR 65-2634

Unclassified report

Availability: Published in Bulletin of the American Mathematical Society v70 n6 p820-3 Nov 1964. Copies to DDC users only.

Descriptors: (*Operators (Mathematics), Identities), (*Identities, Operators (Mathematics)), Algebra, Real numbers, Functional analysis

AD-627 835 Fld. 12/1
MINNESOTA UNIV MINNEAPOLIS DEPT OF MATHEMATICS
STRONG RATIO LIMIT PROPERTY FOR R-RECURRENT MARKOV CHAINS,
by William E. Pruitt. 3 Oct 63, 9p. Contract AF-AFOSR-381-63 Proj. AF-9749 Task 974902
AFOSR 65-2638

Unclassified report

Availability: Published in Proceedings of the American Mathematical Society v16 n2 p196-200 Apr 1965. Copies to DDC users only.

Descriptors: (*Probability, Theorems), Inequalities, Stochastic processes

AD-627 859 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
AERONAUTICAL CHART AND INFORMATION CENTER ST LOUIS MO LINGUISTIC SECTION
USE OF YU. D. SOKOLOV'S METHOD IN SOLVING DIRICHLET PROBLEM FOR POISSON'S EQUATION,
by A. Yu. Luchka. Jan 66, 6p. Rept. no. TC-979 TT 66-60486

Unclassified report

Pro Zastosuvannya Metody Yu. D. Sokolova do Rozvyazannya Zadachi Dirikhle Dlya Rivnyannya Puassona, trans. of Akademiya Nauk URSR, Kiev. Dopovidi, v4 p426-9 1965.

Descriptors: (*Boundary value problems, Numerical analysis), (*Numerical methods and procedures, Boundary value problems), Potential theory, Integral equations, USSR

The solving of Dirichlet's internal problem for Poisson's equation by the method of potentials leads to Fredholm's linear integral equation of the second type. The present work shows that Sokolov's method used for such a class of integral equations is always coinciding and reliable with respect to round-off errors.

AD-627 860 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
AERONAUTICAL CHART AND INFORMATION CENTER ST LOUIS MO LINGUISTIC SECTION
USE OF YU. D. SOKOLOV'S METHOD IN SOLVING NEUMANN'S EXTERNAL PROBLEM FOR POISSON'S EQUATION (PRO ZASTOSUVANNYA METODU YU. D. SOKOLOVA DO ROSVYAZANNYA ZOVNISHNOI ZADACHI NEIMANA DLYA RIVNYANNYA PUASSONA),
by A. Yu. Luchka. Jan 66, 8p. Rept. no. TC-980 TT 66-60487

Unclassified report

Trans. of Akademiya Nauk URSR, Kiev. Dopovidi, n5 p547-50 1965.

Descriptors: (*Boundary value problems, Numerical analysis), (*Numerical methods and procedures, Boundary value problems), Functional analysis, Integral equations, USSR

AD-627 926 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
NAVAL MISSILE CENTER POINT MUGU CALIF
ORTHOGONAL TRANSFORMATIONS BY QUATERNIONS.
Technical memo.,
by M. A. Garcia. 28 Jan 66, 25p. Rept. no. NMC-TM-66-1

Unclassified report

Descriptors: (*Transformations (Mathematics), Complex numbers), (*Complex numbers, Transformations (Mathematics)), Euler's angles, Matrix algebra, Geometry, Real numbers

A discussion on the application of quaternions to the transformation of rectangular cartesian coordinate systems is presented. The discussion is didactic in nature, intended to introduce this particular application of quaternions. Towards this end, the quaternion transformation is related to both matrix and dyad transformations. Quaternion transformations offer advantages in special cases over the more commonly used direction cosine transformation and the Euler's angles transformation. For example, a quaternion transformation requires fewer elements than a direction cosine transformation and it is not subject to the singularities of an Euler's angles transformations. (Author)

AD-627 940 Fld. 12/1
PURDUE UNIV LAFAYETTE IND
GENERALIZATIONS OF THE MAXIMAL ERGODIC THEOREM,
by Glen Baxter. 23 Feb 65, 3p. Contract AF-AFOSR-722-65
AFOSR 65-2639

Unclassified report

Availability: Published in The Annals of Mathematical Statistics, v36 n4 p1292-3 Aug 1965 Copies to DDC users only.

Descriptors: (*Measure theory, Optimization)

AD-627 943 Fld. 12/1
CALIFORNIA UNIV SANTA BARBARA DEPT OF MATHEMATICS
AN EXTENSION OF THE CLASS OF ALTERNATIVE RINGS,
by D. L. Outcalt. 17 Sep 63, 15p. Contract AF-AFOSR-698-65 Proj. AF-9749 Task 974901
AFOSR 65-2071

Unclassified report

Prepared in cooperation with Claremont Men's College, Calif.

Availability: Published in The Canadian Journal of Mathematics v17 p130-41 1965. Copies to DDC users only.

Descriptors: (*Rings (Mathematics), Theory), Algebra, Identities

Let R denote a non-associative ring of characteristic not 2 or 3 satisfying the identity (x,y,z)=(y,z,x) where the associator (a,b,c) is defined by (a,b,c) = (ab)c - a (bc). It is shown that if R is either simple or primitive, then R is a Cayley-Dickson algebra or associative; and if R is semi-simple, then R is a subdirect sum of Cayley-Dickson algebras and primitive, associative rings. (Author)

AD-627 945 Fld. 12/1
LOUISIANA STATE UNIV BATON ROUGE DEPT OF MATHEMATICS
REPRESENTATIONS OF DERIVATIVES OF ANALYTIC FUNCTIONS BY A MULTI-DIMENSIONAL TYPE OF LA PLACE TRANSFORMS,
by Pasquale Porcelli. 1961, 6p. Contract AF-AFOSR-68-63 Proj. AF-9749 Task 974901
AFOSR 65-2180

Unclassified report

Availability: Published in Proceedings of the Louisiana Academy of Sciences v27 p110-3 Dec 1964. Copies to DDC users only.

Descriptors: (*Functions, Integral transforms), (*Integral transforms, Functions), Approximation (Mathematics), Functional analysis

The purpose of this note is to develop a representation theory for the derivatives of analytic functions that are the La Place transforms of square summable functions on (0, infinity). The representation is presented in a theorem where it is shown that the n-th derivative of such a function is given by the La Place transform of a square summable function on the positive cone of the 2n + 1 dimensional Euclidean space. The proof of the representation theorem is presented in the form of two lemmas and it involves the solvability of certain infinite systems of linear equations in the countably infinite dimensional Hilbert space. Briefly, the first lemma shows that the definition of the analytic function implies one infinite system is solvable and the necessary condition for this system to have a solution is also a sufficient condition for a second infinite system to have a solution. The second lemma shows that the solution of the second infinite system can be extended to give a representation for the derivative of the analytic function in question. The interest in representation theorems of the type presented stems from the fact that they are related to problems in approximation theory and to the distribution of zeros of the successive derivatives of certain types of analytic functions. Inasmuch as some aspects of these relationships have already been published, their details are not given in this note. (Author)

AD-627 946 Fld. 12/1
ILLINOIS UNIV URBANA
ON SEPARATION BY HARMONIC FUNCTIONS,
by L. A. Rubel. 22 Mar 63, 6p. Contract AF-AFOSR-460-63
AFOSR 65-2599

Unclassified report

Availability: Published in 'Acta Mathematica Academiae Scientiarum Hungaricae v15 n1|2 p175-6 1964. Copies to DDC users only.

Descriptors: (*Potential theory, Functions), Separation

The paper concerns the following question which was posed to many mathematicians, among them some experts in potential theory: For which values of n is the following statement true. If f is a superharmonic function on Euclidean space E (n), h a subharmonic function there, and f< or = h everywhere, then there exists a harmonic function g such that f< or = g< or = h everywhere. The answer is that the statement holds only for n=1, where it becomes the familiar assertion that a concave function f that lies below a convex function h may be separated from h by a linear function g.

AD-627 948 Fld. 12/1
ILLINOIS UNIV URBANA
TAUBERIAN THEOREMS FOR SUM SETS,
by P. Erdos, B. Gordon, L. A. Rubel, and E. G. Straus. 1964, 12p. Contract AF-AFOSR-460-63
AFOSR 65-2640

Unclassified report

Availability: Published in Acta Arithmetica v10 p177-89 1964. Copies to DDC users only.

Descriptors: (*Series, Set theory), (*Set theory, Series), Real numbers, Combinatorial analysis, Asymptotic series, Distribution theory

The sums formed from the set of non-negative powers of 2 are just the non-negative integers. It is easy to obtain 'abelian' results to the effect that if a set is distributed like the powers of 2, then the sum set will be distributed like the non-negative integers. The present paper is concerned with converse, or 'Tauberian' results. The main theme of the paper is the following question: if the set of sums formed from a given set of positive real numbers resembles an arithmetic progression, how much must the original set resemble a set of constant multiples of powers of 2.

AD-627 949 Fld. 12/1
SYRACUSE UNIV N Y
INEQUALITIES AND THE SATURATION CLASSES OF BERNSTEIN POLYNOMIALS,
by G. G. Lorentz. 1963, 9p. Contract AF-AFOSR-424-63
AFOSR 65-2343

Unclassified report

Availability: Published in ISNM v5 p200-7 1964. Copies to DDC users only.

Descriptors: (*Inequalities, Polynomials), (*Polynomials, Functional analysis), Approximation (Mathematics), Operators (Mathematics), Series

AD-627 951 Fld. 12/1
INSTITUTE FOR ADVANCED STUDY PRINCETON N J
QUADRATIC FORMS THETA AND THETA-FIBRE-BUNDLES.
Revised ed.,
by Marston Morse. 30 Jul 64, 40p. Contract AF-AFOSR-357-63
AFOSR 65-2630

Unclassified report

Revision of manuscript submitted 10 Apr 64.

Availability: Published in Annals of Mathematics v81 n2 p303-40 Mar 1965. Copies to DDC users only.

Descriptors: (*Polynomials, Algebraic topology), (*Algebraic topology, Polynomials), Mapping (Transformations)

AD-627 972 Fld. 12/1, 20/4
CFSTI Prices: HC $2.00 MF $0.50
AERONAUTICAL RESEARCH ASSOCIATES OF PRINCETON INC N J
ROTATIONAL SOLUTIONS OF THE EULER EQUATIONS.
Scientific rept.,
by Derek A. Barnes, and Roger D. Sullivan. Sep 65, 37p. Rept. no. ARAP-79
Contract AF49 (638)-1437 Proj. AF-9781 Task 978101
AFOSR 65-2656

Unclassified report

Descriptors: (*Partial differential equations, Approximation (Mathematics), (*Fluid mechanics, Approximation - (Mathematics)), (*Incompressible flow, Jets), Axial symmetric flow, Equations of motion

Steady-state rotational solutions of the Euler equations for an incompressible fluid are discussed, with emphasis on flows characterizing the impingement of a rotational jet upon a plane surface. These solutions are aimed at understanding actual rotational flows undergoing strong interactions, where, to a first approximation, viscous stresses may be ignored after the creation of vorticity. Of particular interest are two axially symmetric flows which have finite velocity profiles at large distances from the impingement plane. One of these has a parabolic profile and represents a flow inside a cylindrical cup of finite radius; the other has a Gaussian profile with streamlines extending to infinity. Analytical expressions and computed values for velocities, velocity gradients, and pressures are given, and a comparison is made with experimental data obtained at ARAP. (Author)

AD-627 975 Fld. 12/1
MICHIGAN UNIV ANN ARBOR DEPT OF MATHEMATICS
A PROBLEM OF BING,
by R. L. Wilder. 8 Jul 65, 6p. Contract AF-AFOSR-373-63
AFOSR 65-2626
Unclassified report

Availability: Published in The Proceedings of the National Academy of Sciences, v54 n3 p683-7 Sep 1965. Copies to DDC users only.

Descriptors: (*Algebraic topology, Theorems), Set theory

AD-627 976 Fld. 12/1
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF MATHEMATICS
INTEGRAL THEOREMS FOR HARMONIC VECTORS IN THREE REAL VARIABLES,
by Josephine Mitchell. 5 Mar 63, 22p. Contract AF-AFOSR-62-59
AFOSR 65-2628
Unclassified report

Descriptors: (*Potential theory, Integrals), (*Real variables, Potential theory), Functions, Complex variables, Operators (Mathematics), Mapping (Transformations)

AD-627 979 Fld. 12/1
MINNESOTA UNIV MINNEAPOLIS
ON PERMUTATIONS INDUCED BY COMMUTING FUNCTIONS, AND AN EMBEDDING QUESTION,
by Glen Baxter, and J. T. Joichi. 15 Jun 63, 12p. Contract AF-AFOSR-381-63
AFOSR 65-2632
Unclassified report

Research supported in part by National Science Foundation.

Availability: Published in Math. Scand. v13 p140-50 1963. Copies to DDC users only.

Descriptors: (*Permutations, Functions), (*Functions, Permutations), (*Algebra, Functions), Mapping (Transformations), Topology, Theorems

AD-627 980 Fld. 12/1
MINNESOTA UNIV MINNEAPOLIS
ON A CLASS OF COMMUTING FUNCTIONS,
by Glen Baxter, and J. T. Joichi. 15 Jul 64, 12p. Contract AF-AFOSR-381-63 ,NSF-G2495
AFOSR 65-2631
Unclassified report

Availability: Published in Nieuw Archief voor Wiskunde v12 (s3) p126-36 1964. Copies to DDC users only.

Descriptors: (*Functions, Theory), Mapping (Transformations), Topology, Matrix algebra, Calculus of variations

Let X be the unit interval (0, 1) and let F and G be a pair of functions mapping X continuously into itself, and which commute under composition, that is, F (G (x)) = G (F (x)). It has been conjectured that under these circumstances the functions F and G must have a common fixed point. This conjecture has only been verified in some very special cases. It appears to us that among the primary difficulties encountered in attempting to verify the conjecture in more general cases is the lack of a plentiful supply of examples to investigate. This paper introduces a method by which a variety of such pairs of functions may be constructed.

AD-627 981 Fld. 12/1
MINNESOTA UNIV MINNEAPOLIS
EIGENVALUES OF MODULUS I,
by Benton Jamison. 20 Nov 63, 4p. Contract AF-AFOSR-381-63
AFOSR 65-2623
Unclassified report

Availability: Published in Proceedings of the American Mathematical Society v16 n3 p375-7 Jun 1965. Copies to DDC users only.

Descriptors: (*Complex numbers, Functional analysis), Theorems, Topology

In this paper B is a (complex) Banach space, T is a bounded linear operator on B, and C is the set of unimodular complex numbers with the usual topology. The following theorem is proven: If B is separable, and if the norm of T to the nth power $< or = M <$ infinity for all n = 1, 2, . . ., then T cannot have an uncountable number of eigenvalues of modulus 1.

AD-627 990 Fld. 12/1
PISA UNIV (ITALY)
CARLEMAN ESTIMATES FOR THE LAPLACE-BELTRAMI EQUATION ON COMPLEX MANIFOLDS,
by Aldo Andreotti, and Edoardo Vesentini. 15 Dec 63, 52p. Contract AF-EOAR-29-63
AFOSR 65-2646
Unclassified report

Supported in part by National Science Foundation. Prepared in cooperation with Harvard Univ., Cambridge, Mass.

Availability: Published in Institut des Hautes Etudes Scientifiques, Paris (France), Publications Mathematiques n25 p313-62 1965. Copies to DDC users only.

Descriptors: (*Algebraic topology, Operators (Mathematics)), (*Inequalities, Operators (Mathematics)), Functional analysis, Italy

AD-627 305 See Fld. 14/4

AD-627 374 See Fld. 9/1

AD-627 389 See Fld. 5/4

AD-627 514 See Fld. 7/4

AD-627 740 See Fld. 9/1

AD-627 760 See Fld. 9/2

AD-627 795 See Fld. 9/2

AD-627 799 See Fld. 14/4

AD-627 890 See Fld. 13/2

12/2. OPERATIONS RESEARCH

AD-627 295 Fld. 12/2, 15/5
CFSTI Prices: HC $3.00 MF $0.75
AMMUNITION PROCUREMENT AND SUPPLY AGENCY JOLIET ILL OPERATIONS RESEARCH DIV
USING OPERATIONS RESEARCH TECHNIQUES FOR MINIMUM COST PROCUREMENT,
by Gerald J. Bodoh, and LeRoy R. Widmeyer. Jun 65, 73p.
Unclassified report

Descriptors: (*Operations research, Procurement), (*Procurement, Costs), Linear programming, Nonlinear programming, Ammunition

PART I, Building and using linear programming models: Chapter 1, Introduction to operations research. Chapter 2, Building linear programming models: (1) Details of the concepts underlying linear programming; specifications for the precise mathematical nature of linear programming; presentation of a step-by-step method of model building: (2) illustration of the principles underlying linear programming by showing how they apply to a particular problem, the least cost procurement problem for 0.45-caliber ammunition. PART II, Nonlinear programming: Chapter 3, Solving nonlinear programming problems, with an example of a single total requirement for a certain number of rounds of 7.62-mm (NATO-round) ammunition.

AD-627 563 Fld. 12/2
RIAS INC BALTIMORE MD
STABILITY IN GENERAL CONTROL SYSTEMS,
by Emilio Roxin. 1964, 37p. Contract AF49 (638)-1242 ,NASw-845 Proj. AF-9749 Task 974901
AFOSR 65-2435
Unclassified report

Prepared in cooperation with Buenos Aires Univ. (Argentina) and Brown Univ., Providence, R. I. Div. of Applied Mathematics.

Availability: Published in Journal of Differential Equations, v1 n2 p115-50 Apr 1965. Copies to DDC users only.

Descriptors: (*Control systems, Stability), (*Differential equations, Control systems), Functional analysis, Topology, Argentina

AD-627 646 Fld. 12/2
CFSTI Prices: HC $2.00 MF $0.50
CRUFT LAB HARVARD UNIV CAMBRIDGE MASS
A FUNCTIONAL EQUATION METHOD FOR ESTIMATING CONVERGENCE INTERVALS AND TRUNCATION ERRORS IN SMALL PARAMETER NONLINEAR OSCILLATIONS)
Interim technical rept.,
by R. J. McLaughlin. Dec 65, 47p. Rept. no. TR-486
Contract Nonr-1866 (16) Proj. NR-372-012
Unclassified report

Descriptors: (*Oscillation, Nonlinear systems), (*Equations, Harmonic analysis), Algebra, Differential equations, Power series, Errors

Most current methods of constructing periodic solutions of quasi-linear differential equations with periodic right-hand sides suffer from two important practical defects. Although under appropriate conditions the theory of such equations guarantees the existence of a periodic solution for 'sufficiently small' values of the perturbing parameter, there is usually no indication of how small the parameter must be, and hence no indication whether any particular calculated solution really applies. Secondly, although in principle an exact solution may usually be constructed by infinite iteration of some computation algorithm (assuming the parameter to be sufficiently small), there is usually no indication of the error remaining after only a finite number of iterations, and hence no indication of the accuracy of the approximate solution with which one must be satisfied in practice. The present report describes a method of constructing, from the majorized right-hand side of the original differential equation, a certain functional algebraic equation whose solution is a majorant for the periodic solution of the differential equation. This majorant has the property that its power series expansion majorizes the formal power series expansion of the periodic solution term by term. (Author)

AD-627 647 Fld. 12/2
CFSTI Prices: HC $1.00 MF $0.50
CRUFT LAB HARVARD UNIV CAMBRIDGE MASS
NONLINEAR FEEDBACK SOLUTION TO A BOUNDED BRACHISTOCHRONE PROBLEM IN A REDUCED STATE SPACE.
Interim technical rept.,
by Jason L. Speyer. Dec 65, 24p. Rept. no. TR-492
Contract Nonr-1866 (16) Proj. NR-372-012
Unclassified report

Descriptors: (*Feedback, Control systems), (*Dynamic programming, Control), (*Optimization, Trajectories), Calculus of variations, Nonlinear systems

The optimal nonlinear feedback law for both an unbounded and bounded Brachistochrone problem is given. These control laws describe the Brachistochrone problem in a very simple manner. These laws are derived by using a dimensionless set of state variables which are of lower dimension than the original state space. Also using this reduced state space a two dimensional instead of three dimensional field of extremals is constructed for the bounded Brachistochrone problem. This illustrates that the state space may be reduced so that the storage of a field of extremal trajectories will not exceed the storage capacity of a practical on board computer. In this way, optimal feedback control may become a practical technique for a larger class of nonlinear systems. (Author)

AD-627 683 Fld. 12/2, 9/3
NEW YORK UNIV N Y DEPT OF ELECTRICAL ENGINEERING
FUNCTIONAL ANALYSIS IN AUTOMATIC CONTROL,
by Philip E. Sarachik. 1965, 14p. Contract AF-AFOSR-747-65 Proj. AF-9749 Task 974901
AFOSR 65-2076

Unclassified report

Availability: Published in IEEE Intern Conv Record p96-107 1965. Copies to DDC users only.

Descriptors: (*Functional analysis, Control systems), (*Control systems, Optimization), Dynamics, Equations, Automatic

Some recent applications of functional analysis to automatic control problems are described. A sufficient introduction to basic concepts is given to make the paper self-contained. Applications to the minimum norm and minimum time problems are discussed and it is shown that an analytical form of the optimal solution can be readily found by using certain functional analysis concepts. It is indicated how the iteration techniques for solution of operator or functional equations in a Banach space can be applied to generate a computational algorithm for obtaining the solution to an optimization problem. It is also shown how the functional analysis approach can reveal what particular properties of an unknown system must be identified in order to solve an optimization problem. (Author)

AD-627 717 Fld. 12/2, 9/3
NEW YORK UNIV N Y DEPT OF ELECTRICAL ENGINEERING
CONTROLLABILITY AND OBSERVABILITY OF LINEAR DISCRETE-TIME SYSTEMS,
by P. E. Sarachik, and E. Kreindler. 26 Sep 64, 14p. Contract AF33 (657)-9185 ,AF-AFOSR-747-65 Proj. AF-9749 Task 974901
AFOSR 65-2077

Unclassified report

Prepared in cooperation with Grumman Aircraft Engineering Corp., Bethpage, N. Y. Research Dept.

Availability: Published in International Journal of Control v1 n5 p419-32 May 1965. Copies to DDC users only.

Descriptors: (*Control systems, Linear systems), Time, Optimization, Digital systems, Synthesis

A system is considered to be completely controllable if any initial state can be transferred to any other state in finite time; it is completely observable if the state at any time can be determined from knowledge of the inputs and outputs over a finite time. In this paper a self-contained development is presented of the subject of controllability and observability of discrete-time systems. It is noted that the discrete-time case is directly analogous to the continuous-time case. In fact, most of the results for the discrete-time case can be obtained from the continuous-time case by replacing the continuous-time variable t with discrete points t sub k on the t-axis and by replacing integrals with summations. However, some differences exist, and a direct and independent approach to controllability and observability is used here to avoid such differences and to consider the more general discrete-time systems. (Author)

AD-627 718 Fld. 12/2
CFSTI PricesMF $1.00
SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS PHILADELPHIA PA
JOURNAL OF THE SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS. SERIES A. CONTROL. VOLUME 2, NUMBER 3.
1965, 195p. Contract AF-AFOSR-527-64 Proj. AF-9749 Task 974901
AFOSR 65-2123

Unclassified report

Prepared in cooperation with Systems Research Center, Case Inst. of Tech., Cleveland, Ohio, Contract Nonr-1141 (12).

Availability: Available from Society for Industrial and Applied Math, Pub., 33 S. 17th. St., Philadelphia.

Descriptors: (*Periodicals, Mathematics), (*Mathematics, Periodicals), (*Control, Optimization), Model theory, Differential equations, Control systems, Time-lag theory

Contents: An analytic theory of modeling for a class of minimal-energy control systems (Disturbance-free case) by Walter J. Culver; Minimum effort control of several terminal components by J. V. Breakwell and F. Tung; Some mathematical theory of the penalty method for solving optimum control problems by Kiyohisa Okamura; Optimal control of aperiodic discrete-time systems by B. W. Jordan and E. Polak; Some applications of stochastic differential equations to optimal nonlinear filtering by W. M. Wonham; The asymptotes of the time lag root -locus by Allan M. Krall; Time optimal control with amplitude and rate limited controls by W. W. Schmaedeke and D. L. Russell; Analysis of linear systems by means of laguerre functions by James C. I. Dooge; Penalty functions and bounded phase coordinate control by D. L. Russell; Optimal-thrust trajectories in an arbitrary gravitational field by Joseph G. Gurley; Minimax control of discrete time stochastic systems by D. D. Sworder.

AD-627 736 Fld. 12/2
NEW YORK UNIV N Y
IDENTIFICATION OF THE STEADY STATE OPERATOR FOR DISCRETE SELF-OPTIMIZING SYSTEMS,
by Philip E. Sarachik. 3 Oct 64, 5p. Contract AF-AFOSR-747-65 Proj. AF-9749 Task 974901
AFOSR 65-2075

Unclassified report

Revision of manuscript submitted 21 May 1964.

Availability: Published in IEEE Transactions on Automatic Control vAC-10 n1 p83-5 1 Jan 1965. Copies to DDC users only.

Descriptors: (*Operators (Mathematics), Optimization), (*Automatic, Control systems), Stochastic processes, Nonlinear systems, Functional analysis

When one attempts to design self-optimizing or adaptive control systems for plants with unknown dynamic characteristics, a major problem is that, due to the unknown initial conditions on the plant, the plant dynamics may inadvertently be identified in terms of an operator which is not unique. Since erroneous results are obtained when optimization is performed in terms of a nonunique operator, a means of characterizing a plant in terms of a unique steady-state operator, is described. This paper considers the problem for discrete-time plants and shows that the entire operator need not be identified but only certain essential characteristics of the operator. A general procedure for performing the identification and some simplifications which are applicable in special cases are described. (Author)

AD-627 737 Fld. 12/2
WASHINGTON UNIV ST LOUIS MO
FUNCTIONAL REPRESENTATION OF NONLINEAR SYSTEMS, INTERPOLATION AND LAGRANGE EXPANSION FOR FUNCTIONALS,
by D. Gorman, and J. Zaborszky. 1965, 11p. Contract AF-AFOSR-482-65 Proj. SRMA-9749 Task 974901
AFOSR 65-2061

Unclassified report

Availability: Published in American Society Mechanical Engineers session10 paper1 p169-77 March 1965. Copies to DDC users only.

Descriptors: (*Control systems, Functions), (*Functions, Nonlinear systems), Series, Approximation (Mathematics), Optimization, Differential equations, Functional analysis, Servomechanisms

An original analytic representation is introduced for systems where differential equations are available. The structure of the functional is analyzed with nonzero initial conditions. Functional representations are introduced for systems described by past measured input-output records. (Author)

AD-627 761 Fld. 12/2
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
A GENERAL FORMULATION OF THE TOTAL SQUARE INTEGRALS FOR CONTINUOUS SYSTEMS.
Revised ed.,
by E. I. Jury, and A. G. Dewey. 24 Aug 64, 2p. Contract AF-AFOSR-292-64
AFOSR 65-2432

Unclassified report

Revision of manuscript submitted 13 Aug 64.

Availability: Published in IEEE Transactions on Automatic Control vAC-10 n1 p119-20 Jan 1965. Copies to DDC users only.

Descriptors: (*Integrals, Matrix algebra), (*Control systems, Synthesis), Determinants, Series, Feedback

The problem of evaluating the total square integral arises in the analysis and design of feedback control systems, both for deterministic and for stochastic inputs. The first approach to this problem was made by James, et al. using the solution of a recurrence formula. Integrals up to the seventh order were tabulated. A few years later, Newton et al. presented a method based on the solution of a matrix equation dependent on whether n, the order of the system, was even or odd. The earlier table was extended up to the tenth order. Kalman and Bertram recently mentioned an approach from the point of view of Liapunov functions. However, this leads to the solution of a system of algebraic equations and the method has no computational advantage over that of Newton. The points discussed in this correspondence are (1) The formulation of a general expression for any order n as the ratio of two determinants. This could easily be programmed on a digital computer. (2) It is shown that the denominator determinant is precisely equal to delta sub n, the nth Hurwitz determinant. This equivalence guarantees the existence of the total square integral for a stable system. (3) Finally a scheme is shown whereby the amount of computation is minimized. For design problems where there are algebraic coefficients, an expression is given involving the expansion of only (n-2) determinants of order (n-3). In this expression no cancellation of terms occurs.

AD-627 771 Fld. 12/2
RENSSELAER POLYTECHNIC INST TROY N Y
BIMATRIX EQUILIBRIUM POINTS AND MATHEMATICAL PROGRAMMING,
by C. E. Lemke. Sep 64, 12p. Contract AF-AFOSR-339-63 Proj. 9749 Task 974901
AFOSR 65-2423

Unclassified report

Availability: Published in Management Science v11 n7 p681-9 May 1965. Copies to DDC users only.

Descriptors: (*Mathematical programming, Matrix algebra), (*Matrix algebra, Mathematical programming), (*Game theory, Mathematical programming), Theory, Quadratic programming

Some simple constructive proofs are given of solutions to the matric system Mz - w = q; z > or = 0; w > or 0; and z (T)w = 0, for various kinds of data M, q, which embrace the quadratic programming problem and the problem of finding equilibrium points of bimatrix games. The general scheme is, assuming non-degeneracy, to generate an adjacent extreme point path leading to a solution. The scheme does not require that some functional be reduced. (Author)

AD-627 778 Fld. 12/2
STATE UNIV OF NEW YORK STONY BROOK
AN EXTENSION OF ASCOLI'S THEOREM AND ITS APPLICATIONS TO THE THEORY OF OPTIMAL CONTROL.
Revised ed.,
by S. S. L. Chang. 18 Jul 63, 28p. Contract AF-AFOSR-542-64 Proj. AF-9749 Task 974901
AFOSR 65-2333

Unclassified report

Revision of manuscript submitted 7 Sep 61.

Availability: Published in Transactions of the American Mathematical Society v115 n3 p445-70 Mar 1965. Copies to DDC users only.

Descriptors: (*Functional analysis, Control systems), (*Control systems, Optimization), Measure theory, Topology, Differential equations, Theorems

Ascoli's theorem deals with continuous functions and states that the space of bounded, equicontinuous functions is compact. The present paper extends it to the measurable functions. The space of bounded 'equimeasurable functions,' is compact, and it contains the bounded equicontinuous functions as a subset. The above theorem is applied to two problems in the theory of optimal control: (1) To give an existence proof of optimal control among allowed control functions which are measurable and enter the system equations in a nonlinear manner; and (2) To derive a necessary condition for optimal control in bounded phase space. The condition is different and simpler than the one derived previously by Gamkrelidze. It is proved to be also sufficient for linear systems, and its applications to engineering problems are given in previous papers.

AD-627 921 Fld. 12/2, 13/8
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
COMPETITIVE PRODUCTION FOR CONSTANT RISK UTILITY FUNCTIONS,
by J. J. McCall. Feb 66, 13p. Rept. no. P-3304

Unclassified report

Descriptors: (*Industrial production, Optimization), (*Optimization, Industrial production), Decision theory, Statistical functions, Statistical distributions, Operations research

The purpose of this paper is to obtain the optimal competitive outputs for three different firms having constant risk utility functions.

AD-627 944 Fld. 12/2
NORTHWESTERN UNIV EVANSTON ILL
THE USE OF LUR'E FORMS TO ESTABLISH A SUFFICIENT CONDITION FOR STABILITY OF A CLASS OF DISCRETE FEEDBACK SYSTEMS WITH PARALLEL NONLINEAR ELEMENTS,
by G. J. Murphy, and S. H. Wu. 1964, 11p. Contract AF-AFOSR-270-63 Proj. AF-9749 Task 9749
AFOSR 65-2429

Unclassified report

Prepared in cooperation with TRW Space Technology Labs., Redondo Beach, Calif.

Availability: Published in The Proceedings of the Joint Autom Control Council, Evanston, Ill, p755-64 1965. Copies to DDC users only.

Descriptors: (*Stability, Control systems), (*Control systems, Feedback), Nonlinear systems, Model theory, Functional analysis, Matrix algebra

AD-627 968 Fld. 12/2, 9/2
NEW YORK UNIV N Y DEPT OF ELECTRICAL ENGINEERING
MEAN SQUARE RECONSTRUCTION ERROR.
Revised ed.,
by Allan I. Liff. 26 Mar 65, 2p. Contract AF-AFOSR-499-65
AFOSR 65-2424

Unclassified report

Revision of manuscript submitted 17 Nov 1964.

Availability: Published in IEEE Transactions on Automatic Control vAC-10 n3 p370-1 Jul 1965. Copies to DDC users only.

Descriptors: (*Sampling, Errors), (*Automatic, Control), Statistical functions, Optimization

AD-627 297 **See Fld. 14/1**

AD-627 310 **See Fld. 5/1**

AD-627 332 **See Fld. 6/6**

AD-627 434 **See Fld. 14/4**

AD-627 654 **See Fld. 14/4**

AD-627 782 **See Fld. 9/1**

AD-627 886 **See Fld. 14/1**

Field 13-MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

AD-627 766 Fld. 13, 6/5, 6/3
BRUSSELS UNIV (BELGIUM)
ON THE CONTROL OF THE REPLICATION OF TEMPERATE BACTERIOPHAGES SUPERINFECTING IMMUNE HOSTS,
by R. Thomas, and L. E. Bertani. 18 Jun 64, 12p. Contract AF-EOAR-62-17 ,PHS-AI-04390
AFOSR 65-2742

Unclassified report

Availability: Published in Virology v24 n3 p241-53 Nov 1964. Copies to DDC users only.

Descriptors: (*Bacteriophages, Reproduction (Physiology)), (*Bacteria, Immunity), (*Genetics, Bacteriophages), Control, Infections, Belgium, Shigella dysenteriae, Escherichia coli

When lysogenic bacteria are superinfected with phage that is blocked by the immunity of the host and, at the same time, with a mutant (or a related heteroimmune phage) that is insensitive to the immunity of the host, as a rule, only the immunity-insensitive phage is capable of replicating. Those rare particles of immunity-sensitive type that are found in the progeny arise often (if not always) by recombination between the immunity-insensitive phage and either the superinfecting, immunity-sensitive phage or the prophage. Similar results have been obtained with two unrelated systems: the noninducible phage P2 (hosts: Escherichia coli C and Shigella dysenteriae) and the inducible phage lambda (host: Escherichia coli K-12). These observations suggest that the genetic replication of a temperate phage in an immune host is blocked directly as a result of the interaction between an 'immunity substance' and the phage chromosome, rather than only indirectly, through repression of the synthesis of a diffusible 'initiator' necessary to initiate replication of the phage chromosome; or, alternatively, that the above-mentioned 'initiator' is not freely diffusible in the host cells. (Author)

13/1. AIR CONDITIONING, HEATING, LIGHTING, AND VENTILATING

AD-627 388 Fld. 13/1
CFSTI Prices: HC $2.00 MF $0.50
ARMY ENGINEER RESEARCH AND DEVELOPMENT LABS FORT BELVOIR VA
ENGINEER DESIGN TEST REPORT OF A 9,000-BTU/HR, SPLIT-MOUNTING, CONVENTIONAL-TYPE AIR CONDITIONER,
by Oscar Oldberg. Nov 65, 37p. Rept. no. AERDL-R-1836
Task 1D643303D545-03

Unclassified report

Descriptors: (*Air conditioning equipment, Performance (Engineering)), Military requirements, Electronic equipment, Tests

The report covers development and testing of a split -package, 9,000-Btu/hr air conditioning unit which can also be operated in unitized, horizontal arrangement. Units of this type may be used for cooling electronic loads in vans and shelters and for general-purpose applications. Electrical heating capability and CBR connections are designed into this unit. (Author)

AD-627 519 **See Fld. 11/4**

AD-627 929 **See Fld. 11/6**

13/2. CIVIL ENGINEERING

AD-627 890 Fld. 13/2, 18/6, 12/1
CFSTI Prices: HC $2.00 MF $0.50
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
MONTE CARLO CALCULATIONS OF GAMMA-RAY STREAMING THROUGH COPLANAR AND NONCOPLANAR DUCTS.
Technical rept. for Jul 64-Jun 65,
by Leonard B. Gardner, and Alan J. Mettler. Jan 66, 30p. Rept. no. TR-R-412
Proj. Y-F008-08-05-201

Unclassified report

Descriptors: (*Gamma-ray scattering, Statistical analysis), (*Monte Carlo method, Gamma-ray scattering), Programming (Computers), Concrete, Ducts, Penetration

Past experimentation with the streaming of gamma radiation through models of ducted entranceways by using high intensity Au198, Cs137, and Co60 gamma-ray sources has proved to be time consuming. As a means of reducing expenses, a Monte Carlo computer program for studying gamma-ray streaming was utilized. The Monte Carlo technique, using the ADONIS computer code developed by the United Nuclear Corporation, was used to calculate gamma-ray dose rates and energy spectra within two-legged and three-legged rectangular air ducts through concrete. These calculations were performed to intercompare a coplanar and a noncoplanar configuration for Co60 gamma-ray streaming through a three-legged duct. The results of the Monte Carlo calculations are compared with previously obtained experimental findings. The agreement between the Monte Carlo method and previous experiments supports the validity of using the Monte Carlo method to simulate the behavior of gamma rays in ducts. (Author)

AD-627 297 **See Fld. 14/1**

13/3. CONSTRUCTION EQUIPMENT, MATERIALS AND SUPPLIES

AD-627 699 **See Fld. 13/13**

AD-627 889 **See Fld. 11/2**

13/4. CONTAINERS AND PACKAGING

AD-627 701 Fld. 13/4, 13/8
CFSTI Prices: HC $4.00 MF $0.75
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
CORROSION PROTECTION AND CLEANING OF TANKS AND CONTAINERS,
by I. V. Rozhkov. Dec 65, 122p. Rept. no. FSTC-381-T65-673
TT 66-60475

Unclassified report

Trans. of mono. Zashchita ot Korrozii i Zachistka Rezervuarov i Tary, Moscow, 1963 n. p.

Descriptors: (*Containers, Corrosion inhibition), (*Tanks (Containers), Cleaning), USSR, Preservation, Hydrochloric acid, Oils, Lubricants, Sodium compounds, Nitrites, Solutions, Paints, Varnishes, Oil tanks, Tankers, Cleaning compounds, Textbooks

The book examines the new method of preservation of tanks and containers, based on the use of corrosion inhibitors, and its advantages over the old method of preservation of technical stock with oils and greases. A new technology is adduced for washing and preserving drums, tanks, and pipes, which increases 3-4 times the storage time of the preserved stock and decreases several times the cost of these operations. The book also examines briefly the paint-varnish coatings intended for protection of tanks and containers from corrosion. There is a detailed description of modern mechanized methods of cleaning tanks and tankers of residues of petroleum products, dirt, and rust, which decrease several times the idle time of tanks and tankers during cleaning operations. An examination is made of the economy of the new cleaning methods in comparison with the old methods based on manual labor. This textbook is intended for officers and men, as well as for workers engaged in the operation of fuel tank yards and bases, and the tanker fleet. It will be useful also to the workers of plants manufacturing technical stock for the fuel supply service. (Author)

13/6. GROUND TRANSPORTATION EQUIPMENT

AD-627 309 Fld. 13/6
CFSTI Prices: HC $5.00 MF $1.00
MILITARY RESEARCH AND DEVELOPMENT CENTER BANGKOK (THAILAND)
TERRAMECHANIC EVALUATION OF THE XM-561 IN THAILAND,
by Roger J. Borris. Oct 65, 192p. Rept. no. 65-025
Proj. 23.40

Unclassified report

Descriptors: (*Amphibious vehicles, Military requirements), (*Cargo vehicles, Military requirements), Thailand, Soils, Trafficability, Mobility, Environmental tests, Performance (Engineering)

The XM-561 is a six-wheeled, 1 1/4-T, amphibious truck consisting of a dual-body configuration. The four -wheeled tractor is connected to the two-wheeled carrier by an articulating assembly which permits the forward and rear bodies to pitch and roll independently. The center wheels rotate about a fore and aft axis independent of either body and seek their own ground position. As a result, all six wheels contact the ground and full traction is obtained. Two XM-561's, differing essentially only in tire size, were tested. This terramechanic evaluation was conducted to determine the ability of the XM-561 to operate in the various environments of Thailand and to assess the improvement in mobility resulting from the use of Terra tires. Test results show that the XM-561 is clearly superior to the standard M-37 3/4-T truck in all aspects of mobility. Equipping the XM-561 with Terra tires results in a substantial increase in soft soil mobility over the standard tires. However, vehicle width becomes excessive for use on trails in Thailand. The XM-561 is satisfactory for operation in Thailand if the tire size is optimized at the largest tire width permissible without requiring the use of a power steering system. (Author)

AD-627 983 Fld. 13/6
CFSTI Prices: HC $1.00 MF $0.50
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
SNOW TRANSPORT EQUIPMENT MODEL 40 TOWED SNOWPLOW CARRIER.
Technical rept., Jan 64-Feb 65,
by R. W. Hansen. Dec 65, 23p. Rept. no. TR-R-417
Proj. Y-F015-11-01-240

Unclassified report

Descriptors: (*Snow vehicles, Towed vehicles), (*Trailers, Snow vehicles), (*Cargo vehicles, Snow vehicles), Sleds, Snow removal, Bulldozers

A 40-foot-long ski-mounted snowplow carrier, designed for towing, was developed to eliminate pitching and rolling of the snowplow on deep snow and to permit uniform removal of snow from borrow pits, compacted-snow areas, and ice. The carrier includes two grader blades which funnel the snow into the feeder box of a rotary snowplow. These blades are hydraulically controlled for leveling or plowing. Two prototype snowplow carriers, towed by Size 2 tractors, were used near McMurdo, Antarctica, during Deep Freeze 64 and 65 for transporting fill snow to elevate a 150by 6,000-foot experimental compacted-snow runway and a 3-mile-long road. They were also used for cleaning drift snow from the experimental compacted-snow runway and the operational sea-ice runway. In these operations, snow was cast up to 100 feet at rates up to 2,000 cubic yards per hour. It was concluded that the Model 40 snowplow carrier is suitable for elevating roads and runways on deep snow and for clearing drift from compacted snow and ice. It should be included in the equipment allowance for polar installations on snow. (Author)

AD-627 573 **See Fld. 1/3**

13/8. INDUSTRIAL PROCESSES

AD-627 466 Fld. 13/8
CFSTI Prices: HC $2.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
DESIGN PARAMETERS FOR INERT GAS WELDING AND VACUUM BRAZING OF VACUUM COMPONENTS.
Technical rept.,
by John J. Sullivan, and John B. Schultz. Nov 65, 35p. Rept. no. ECOM-2651
Proj. DA-1P0-14501-B11A Task 1P0-14501-B11A-01-34

Unclassified report

Descriptors: (*Welding, Vacuum apparatus), (*Vacuum apparatus, Thermal joining), (*Brazing, Vacuum apparatus), (*Inert gas welding, Vacuum apparatus), Stainless steel, Vacuum, Copper, Pipes, Flanges, Cobalt alloys, Nickel alloys, Iron alloys, Fittings

The report describes in detail the commonly encountered fusion welding and vacuum brazing designs for the construction of modern high vacuum components. In the area of fusion welding, the joining of stainless steel tubing to stainless steel flanges, Kovar tubing to stainless flanges, copper tubing to stainless flanges, thin-wall stainless bellows to stainless flanges, butt welding of stainless tubing, and vacuum chamber construction are discussed. The vacuum brazing section includes brazing of feed-thrus to flanges and flange adapters, tubing to flanges, end-caps to tubing and bellows to flange adapters. (Author)

AD-627 608 Fld. 13/8
CFSTI Prices: HC $2.00 MF $0.50
ARMY WEAPONS COMMAND ROCK ISLAND ILL RESEARCH AND ENGINEERING DIV
MACHING 18% NICKEL MARAGING STEEL WITH ROTARY TOOLS.
Technical rept.,
by Raymond A. Kirschbaum. Dec 65, 36p. Proj. PEMA-56209
R1A 65-3561

Unclassified report

Descriptors: (*Maraging steels, Machining), (*Machining, Maraging steels), Drilling machines, Milling machines, Velocity, Drills, Reamers, Taps

Speed and feed combinations for drilling, reaming, tapping and end-milling 18% nickel maraging steel in the annealed condition were determined by laboratory machining tests. Tapping of this material in the maraged (hardened) condition was also successfully accomplished. Comparison of these results with results in the literature and with production data indicate this material may be machined at higher rates than previously recommended. (Author)

AD-627 813 Fld. 13/8
CFSTI Prices: HC $1.00 MF $0.50
WASHINGTON UNIV ST LOUIS MO DEPT OF CHEMICAL ENGINEERING
AN INVESTIGATION OF CARBON DEPOSITION.
Progress rept. no. 3, 1 Nov 65-31 Jan 66,
by Eric Weger. 2 Feb 66, 3p. Contract AF04 (694)-695

Unclassified report

Descriptors: (*Carbon, Deposition), Induction heating, Porosity

A brief summary is given of research on carbon deposition using an induction furnace. The pore structure characterization is discussed.

AD-628 005 Fld. 13/8, 11/2
CFSTI Prices: HC $1.00 MF $0.50
NORTH CAROLINA STATE UNIV RALEIGH DEPT OF ENGINEERING RESEARCH
FLOW AND FRACTURE IN SPINEL STRUCTURED CERAMICS. PHENOMENOLOGICAL

MODEL FOR RATE-CONTROLLED SINTERING.
Technical rept.,
by Hayne Palmour,III,an, and D. Ray Johnson.
Oct 65, 19p. Rept. no. TR-4
Contract DA-31-124-ARO(D)-207 Proj. DA-20014501B32D
AROD 4932:1
Unclassified report

Descriptors: (*Sintering, Ceramic materials), (*Ceramic materials, Spinels), (*Hot working, Ceramic materials), Fracture (Mechanics), Fluid flow, Shrinkage, Volume, Porosity, Surface area

A model expressing the rate of volume shrinkage during sintering as a function of remanent porosity, remanent surface area, surface energy per unit area and an Arrhenius-type thermal activation term has been suggested by analogy with a compaction rate equation previously developed for hot pressed spinel. If, after an appropriate transition from onset, the shrinkage is arbitrarily made proportional to the logarithm of time, so that the shrinkage rate continuously decreases (a condition which permitted densification with essentially no pore entrapment during hot pressing), then the firing temperature must become a non-linear time-dependent variable. Selection of an arbitrary rate constant appropriate to the initial porosity and surface area of the starting compact should permit the attainment of near-theoretical density by sintering. The concept is illustrated with computer solutions based on values for alumina obtained from data available in the literature. (Author)

AD-628 013 Fld. 13/8, 14/2
CFSTI Prices: HC $2.00 MF $0.50
LINDEN LABS INC STATE COLLEGE PA
MACHINING HIGH PURITY ALUMINA.
Quarterly rept. no. 4, 1 Apr-28 Jun 65,
by P. A. Marshall,Jr., 28 Jul 65, 28p. Contract DA-36-039-AMC-03634(E)
Unclassified report

See also AD-624 484.

Descriptors: (*Refractory materials, Machining), (*Machining, Ceramic materials), (*Aluminum compounds, Oxides), (*Ceramic materials, Machining), Inorganic acids, Fluorides, Sintering, Analysis, Carbides

The report describes the machinability of two commercial grade polycrystalline high purity alumina bodies, a 94% and a 96% alumina, after being rendered friable as a result of immersion in 52% aqueous hydrofluoric acid as a function of time. It was found that in performing those machining operations where a single point tool was required, selected grades of carbide tooling were preferred to diamond single point tooling. The report covers the required machining operation with critical analysis of such parameters as feed, speed, machine time, redressing tool time and an estimated rate of output per eight hour day. Further, each machining operation is critically analyzed with respect to problem areas and suggested method to improve upon them are given. (Author)

AD-628 022 Fld. 13/8, 20/2
CFSTI Prices: HC $1.00 MF $0.50
DELAWARE UNIV NEWARK DEPT OF PHYSICS
PRODUCTION AND ANNEALING OF X-RAY AND THERMAL DAMAGE IN CDS SINGLE CRYSTALS.
Technical rept.,
by K. W. Boer, J. C. O'Connell, and C. A. Kennedy. Feb 66, 14p. Rept. no. TR-5
Contract Nonr-4336(00)
Unclassified report

Supported in part by NASA Research Group.

Descriptors: (*Crystal lattice defects, Production), (*Cadmium compounds, Sulfides), (*Annealing, Crystal lattice defects), Radiation damage, X-ray, Heat treatment, Single crystals, Electrical properties

Changes in the defect structure of 'pure' single-crystal platelets of CdS in ultrahigh vacuo (10 to the -10th power Torr) have been produced by 300-keV x-rays and by 'freezing-in' of defects caused by heat treatment in vacuo at temperatures between 100 -350C. The changes were studied by means of the spectral distribution of photocurrent and T.S.C. curves. In both cases, these defects could be annihilated by annealing and the crystals essentially returned to their pretreated states. These reversible changes are discussed in terms of intrinsic defects. After a number of treatment-annealing cycles, the crystals show a small additional change in their electrical properties, which are explainable in terms of memory effect in the case of radiation damage and of desorption from the surface in the case of heat treatments. (Author)

AD-627 395 **See Fld. 11/8**

AD-627 413 **See Fld. 9/1**

AD-627 534 **See Fld. 9/1**

AD-627 601 **See Fld. 9/1**

AD-627 701 **See Fld. 13/4**

AD-627 849 **See Fld. 9/1**

AD-627 850 **See Fld. 9/1**

AD-627 921 **See Fld. 12/2**

13/9. MACHINERY AND TOOLS

AD-627 674 Fld. 13/9, 9/3, 17/2
CFSTI Prices: HC $4.00 MF $1.00
ROTRON MFG CO WOODSTOCK N Y
THE DEVELOPMENT OF A GAS LUBRICATED BEARING BLOWER ASSEMBLY FOR USE IN AN/TED-9 RADIO TRANSMITTER.
Final interim development rept. 3 Aug 64-3 Dec 65.
20 Dec 65, 128p. Contract NObsr-87522
Unclassified report

See also AD-620 269.

Descriptors: (*Gas bearings, Design), (*Blowers, Gas bearings), (*Radio transmitters, Gas bearings), (*Thurst bearings, Gas bearings), (*Journal bearings, Gas bearings), Configuration, Thrust, Performance (Engineering), Electric motors, Magnetic moments, Loading (Mechanics), Magnets, Frequency converters

Investigations of hydrodynamic gas bearings were conducted to determine the effect of geometry variations on bearing performance. The effect of motor magnetic loads on performance was also evaluated. To confirm the validity of the investigations a motor blower was designed meeting the requirements of the AN/TED-9 Radio Transmitter. The results of rig tests and qualification tests of the blower-motor assembly are presented. (Author)

AD-627 920 Fld. 13/9, 11/3, 9/3
CFSTI Prices: HC $1.00 MF $0.50
NAVY MARINE ENGINEERING LAB ANNAPOLIS MD
BEARING MATERIAL INVESTIGATION.
Research and development rept.,
by C. J. Stockhausen. Feb 66, 19p. Rept. no. MEL-32/66
Proj. S-R007-10-02 Task 3821
Unclassified report

Descriptors: (*Bearings, Materials), (*Materials, Bearings), Lubrication, Water, Geometric forms, Stability, Friction, Wear resistance, Coatings, Isocyanate plastics, Elastomers, Fluidized bed processes, Electric motors

A series of materials was studied for geometric stability, friction, and resistance to abrasive wear to establish the potential utility of the material for use in the construction of bearings to be lubricated by water. Tentative base lines for the study of new and modified materials were established. (Author)

AD-628 021 Fld. 13/9
CFSTI Prices: HC $1.00 MF $0.50
AMPEX CORP REDWOOD CITY CALIF
SELF-ACTING FOIL BEARINGS OF INFINITE WIDTH.
Research and engineering pub.,
by Edward J. Barlow. Jan 66, 25p. Rept. no. RR-65-14
Contract Nonr-3815(00) Proj. NR-062-297
Unclassified report

Descriptors: (*Gas bearings, Foils), (*Foils, Gas bearings), Lubrication, Mathematical analysis, Theory, Elasticity, Differential equations, Boundary value problems

The minimum gap between a rigid cylinder and a moving foil (or between a rotating cylinder and a stationary foil) is determined as a function of the wrap angle as well as of the foil speed and tension, the cylinder radius, and the viscosity of the lubricant. (Author)

AD-627 345 **See Fld. 11/8**

13/10. MARINE ENGINEERING

AD-627 352 Fld. 13/10
CFSTI Prices: HC $2.00 MF $0.50
HYDRONAUTICS INC LAUREL MD
EXPERIMENTAL STUDY OF A CAVITY RUNNING BODY,
by T. T. Huang. Sep 65, 37p. Rept. no. TR-515-1
Contract NOw-64-0306-c ,NOw-65-0344-c
Unclassified report

Descriptors: (*Hydrodynamic configurations, Cavitation), (*Cavitation, Drag), (*Drag, Reduction), Skin friction, Blunt bodies, Bodies of revolution, Afterbodies, Gas flow

The results of an experimental investigation of a cavity running body are presented. The cavity running body consists of a blunt base nose of a half body of revolution and an afterbody which is completely enclosed by the ventilated cavity. Thus, the afterbody experiences almost no drag and the cavity drag due to the presence of the ventilated cavity becomes a very important component of the drag acting on the cavity running body. Theoretical and experimental results of every component of the drag of the cavity running body are presented and discussed. It is found that the total drag is almost independent of the vapor cavitation number but is highly dependent on the air flow rate to the cavity. The maximum drag reduction is 25 percent. (Author)

AD-627 378 Fld. 13/10
CFSTI Prices: HC $2.00 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C
SOME EXPERIMENTAL RESULTS OF HULL FORM RESEARCH,
by Po C. Pien. Nov 65, 38p. Rept. no. DTMB-2144
Proj. SR-0090101-00103 Task 0401
Unclassified report

Descriptors: (*Ship hulls, Design), Water waves, Drag, Geometric forms, Ship models

A hull form design procedure based on the wave-making resistance theory is given. To determine its value, this procedure was used to design a number of experimental hull forms. The experimental resistance results of these forms are given. Conclusions are based on comparisons of these results with those of comparable Taylor's Standard Series or Series 60 forms. (Author)

AD-627 432 Fld. 13/10, 9/1
CFSTI Prices: HC $2.00 MF $0.50
NAVY UNDERWATER SOUND LAB NEW LONDON CONN
EVALUATION OF BELTS FOR PROTECTION OF FLEXING ELECTRICAL CABLES IN SUBMARINE ANTENNA SYSTEMS,
by Andrew J. Stanland. 25 Jan 66, 36p. Rept. no. USL-722
Proj. SF-001-08-01-9254

Unclassified report

Descriptors: (*Submarine antennas, Electric cables), (*Power transmission belts, Submarine antennas), Performance (Engineering), Test methods, Antennas components, Extendable structures, Isocyanate plastics, Failure (Mechanics)

The electrical cables associated with submarine retractable antenna masts must be formed into U-shaped loops at the bottom of the masts to allow the cables to flex as the mast is raised to or lowered from periscope depth. The cables are enclosed in a cable loop belt to protect them against damage. This report describes the mechanical evaluation of a PR-1524 Type 2, a PR-1552 and Buna N Type 6, and a Buna N Type 3 cable loop belt. These belts were tested in a chamber that simulated submarine operation and temperature conditions. The results of these tests and recommendations for acceptable cable belt materials depending on operating conditions are presented. (Author)

AD-627 507 Fld. 13/10, 5/1
CFSTI Prices: HC $1.00 MF $0.50
BUREAU OF SHIPS WASHINGTON D C
A NEW PROCEDURE FOR DETERMINING THE HULL STEEL WEIGHT OF MERCHANT SHIPS,
by H. Schneekluth. Nov 65, 6p. Rept. no. Trans-958
TT 66-60449

Unclassified report

Trans. of Hansa (West Germany) v100 n22 p2168 1963.

Descriptors: (*Ship hulls, Weight), Numerical method + procedures, Steel, Costs, Determination, West Germany

AD-627 518 Fld. 13/10, 11/6
CFSTI Prices: HC $4.00 MF $0.75
DEPARTMENT OF THE NAVY WASHINGTON D C
STAINLESS STEEL SCREW PROPELLERS,
by N. N. Sokolov, and M. L. Rosen. 1965, 117p. Rept. no. Translation-977
TT 66-60451

Unclassified report

Trans. of mono. Grebnye Vinti iz Nerzhaveuschei Stali, Leningrad 1960.

Descriptors: (*Stainless steel, Propellers (Marine)), (*Propellers (Marine), Stainless steel), USSR, Casting, Production, Specifications, Mechanical properties, Corrosion resistance, Precision finishing

The pamphlet examines in detail the basic characteristics of stainless steels, which are being used to an increasing extent in the production of ships' propellers of the highest and the normal classes; presents comparative data relative to operational durability of stainless steel propellers and of those made of cast iron, carbon steel and colored metal alloys. (Author)

AD-627 662 Fld. 13/10
CFSTI Prices: HC $1.00 MF $0.50
NAVAL MISSILE CENTER POINT MUGU CALIF
DYNAMIC ANALYSIS OF A SUBMERGED CONTAINER WITH A DEPTH-CONTROL MECHANISM.
Technical memo.,
by M. A. Garcia. 10 Feb 66, 13p. Rept. no. NMC-TM-66-4

Unclassified report

Descriptors: (*Containers, Underwater objects), (*Underwater objects, Hydrodynamics), Equations of motion, Control systems, Depth indicators, Pneumatic devices, Drag, Hysteresis, Mathematical analysis

The report is a theoretical analysis of the transient motion of a submerged container with a pneumatic depth-control system intended to provide preselected depth for a specified period of time. This analysis provides general solutions in terms of quadratures for the motion of the system, and a physical argument on the basis of energy describing the general behavior of the system. Because the initial design concept for the depth-control mechanism introduces a negative hysteresis loop in the restoring function due to control system delays, the undamped system is unstable. However, because of hydrodynamic damping, the system will actually go into a stable limit cycle after the initial transient. (Author)

AD-627 803 Fld. 13/10, 11/9
CFSTI Prices: HC $3.00 MF $0.75
DEPARTMENT OF THE NAVY WASHINGTON D C
SOVIET USE OF PLASTICS IN SHIPBUILDING (IZPOLZVANIE PLASTICHESKIKH MASS V SOVETSKOM),
by A. N. Braslevskii, M. D. Perepelkina, and E. M. Sedina. 1964, 96p. Rept. no. Translation-1054
TT 66-60479

Unclassified report

Trans. of Sudostroenie (USSR) v30 n8 p9-49 1964.

Descriptors: (*Plastics, Ships), (*Marine engineering, USSR), Economics, Moistureproofing, Physical properties

The report covers such topics as: Leather Substitutes in building small crafts; Problems of economics in plastic shipbuilding; Construction and architecture of cutters made from glass plastics; Increasing the water resistance of shipbuilding wood; and Plastics - construction materials for outfitting marine steam turbine installations.

AD-627 822 Fld. 13/10, 11/3
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
INVESTIGATING THE OHMIC RESISTANCE OF ETHINOL COATINGS,
by L. A. Suprun, and V. P. Bardina. 1966, 11p. Rept. no. Translation-2061
TT 66-60480

Unclassified report

Issledovanie Omicheskogo Soprotivleniya Etinolevogo Pokrytiya, trans. of Processings of the Central Scientific-Research Inst. for the Merchant Marine, n. p. 1964 p37-42.

Descriptors: (*Paints, Resistance (Electrical)), (*Ships, Cathodic protection), Ship hulls, Varnishes, Test methods, Coating, USSR

The relation of the amount of ohmic resistance to the area of a painted surface is determined from numerous measurements. The data obtained are necessary for calculations and full-scale tests of the electrochemical shields on the underwater portions of the hulls of ocean-going ships. (Author)

AD-627 475 **See Fld. 17/3**

13/10.1 SUBMARINE ENGINEERING

AD-627 444 **See Fld. 15/7**

AD-627 586 **See Fld. 18/4**

AD-627 929 **See Fld. 11/6**

13/12. SAFETY ENGINEERING

AD-627 421 Fld. 13/12, 21/2
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
SURVEY OF CURRENT FIRE RESEARCH ACTIVITIES,
by Walter G. Berl. Oct 61, 37p. Rept. no. TG-418
Contract NOrd-7386

Unclassified report

Presented at the Division of Fuel Chemistry American Chemical Society, Chicago, Ill. Sep 3-8, 1961.

Descriptors: (*Fires, Scientific research), Reviews, Combustion, Ignition, Solids, Liquids, Powders, Fire extinguishers, Flames

A survey of fire research, including definitions, motivations, and the countries doing it, is presented. Also discussed are the problems associated with fire research as well as the progress being made, both theoretical and actual. A comprehensive list of references document this paper. (Author)

AD-627 430 Fld. 13/12, 14/2
CFSTI Prices: HC $1.00 MF $0.50
SOUTHWEST RESEARCH INST SAN ANTONIO TEX DEPT OF STRUCTURAL RESEARCH
SUMMARY OF COST AND TIME REQUIRED FOR MODIFICATIONS AND CONVERSIONS ON THE USAF SCHOOL OF AEROSPACE MEDICINE HUMAN CENTRIFUGE AND ROTATIONAL FLIGHT SIMULATOR.
Final rept., phase 3,
by A. J. Pryor, L. A. Eggleston, and R. K. Johnston. 10 Dec 65, 16p. Contract AF41 (609)-2715
Proj. SwR1-03-1787

Unclassified report

Descriptors: (*Flight simulators, Hydraulic fluids), (*Centrifuges, Hydraulic fluids), (*Hydraulic fluids, Fire safety), Military requirements, Hazards, Time studies, Costs, Space medicine, Mechanical drawings

A study was made of the fire hazards peculiar to the equipment and operation of the USAF School of Aerospace Medicine Human Centrifuge and Rotational Flight simulator at Brooks Air Force Base, Texas. The study was based on present air force standards and recommendations were outlined in previous reports where hazards exceeded acceptable limits. The report contains cost and time estimates for the accomplishment of the recommendations referred to above. (Author)

13/13. STRUCTURAL ENGINEERING

AD-627 637 Fld. 13/13, 4/2
CFSTI Prices: HC $4.00 MF $0.75
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
DAMAGE CAUSED BY HURRICANE BETSY AT CERTAIN U. S. NAVAL SHORE INSTALLATIONS IN SOUTHEAST UNITED STATES.
Final technical rept. 19 Sep-17 Jan 66,
by P. J. Rush, T. T. Lee, H. A. Goldin, and H. T. Hurst. Jan 66, 112p. Rept. no. TN-N-777

Unclassified report

Descriptors: (*Tropical cyclones, Damage), Storms, Disasters, Bahama Islands, Florida, Louisiana, Structures, Vulnerability, Wind, Waterwaves, Civil engineering

Observation and analyses were made of certain damage caused by Hurricane Betsy which occurred in the Bahama Islands and in the southeastern portion of the United States, September 6-10, 1965. Damage was caused by direct wind forces, by windblown debris acting as missiles, by windtoppled structures and vegetation, by wind -induced waterwaves and tides, by uncontrolled waterborne structures and objects, by direct rainfall, and by flooding of streams and other water areas. Particular note was made of damage to buildings and other framed structures, waterfront and harbor structures, and exposed electrical and mechanical facilities. In the hope of reducing susceptibility of such installations, certain recommendations and proposals for research and development are presented. (Author)

AD-627 661 Fld. 13/13, 11/2
CFSTI Prices: HC $3.00 MF $0.75
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
DYNAMIC SHEAR STRENGTH OF REINFORCED CONCRETE BEAMS, PART I.
Rept. for Jun 62-May 65,
by William A. Keenan. Dec 65, 87p. Rept. no. TR-R-395
Proj. Y-F008-08-02-110

Unclassified report

Descriptors: (*Reinforced concrete, Beams (Structural)), (*Beams (Structural), Reinforced concrete), Reinforcing materials, Loading (Mechanics), Stresses, Shear stresses, Structural properties, Mechanical properties, Tests

A series of reinforced concrete beams were tested to study shear and diagonal tension in beams under dynamic load. The tests constitute the first phase of a study designed (1) to determine criteria for the minimum amount of web reinforcement required for developing the ultimate flexural resistance of beams and (2) to evaluate the difference between these criteria for static and dynamic loading. It was found that (1) the shear resistance at diagonal tension cracking and at first yielding of the stirrups increased under dynamic load, and (2) the formulas presented in a definitive report by a joint committee of the American Concrete Institute (ACI) and the American Society of Civil Engineers (ASCE) adequately predicted the static shear resistance but grossly underestimated the dynamic shear resistance. Evidence is cited which attributes the increase in shear resistance under dynamic load to an increase in the tensile strength of the concrete and yield strength of the stirrups. An effective amount of web reinforcement (rfy), 69 percent less than the amount required by the ACI-ASCE formula, resulted in flexure failures under static and dynamic load. Equations are presented which permit prediction of the dynamic shear resistance corresponding to diagonal tension cracking and first yielding of the stirrups. A dynamic response chart is developed for estimating the maximum shear at the supports of a simple supported beam under a uniform dynamic load. (Author)

AD-627 692 Fld. 13/13, 8/13
CFSTI Prices: HC $3.00 MF $0.75
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
THEORY AND PRACTICE OF FROZEN EARTH-WORKING IN CONSTRUCTION,
by L. A. Bratsev. Dec 65, 64p. Rept. no. FSTC-381-T65-643
TT 66-60469

Unclassified report

Trans. of unidentified Russian mono. p74-87, 88-117, 171-181 1965.

Descriptors: (*Permafrost, Foundations (Structures)), (*Soil mechanics, Permafrost), USSR, Buildings, Housing, Design, Construction, Excavation

Contents: preconstruction engineering preparation of sites and sections, construction methods and conditions for their application, tasks of the engineering -geocryological service in the operation of buildings and structures.

AD-627 699 Fld. 13/13, 13/3
CFSTI Prices: HC $3.00 MF $0.75
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
NEW PREFABRICATED STRUCTURAL PARTS IN CONSTRUCTION,
by A. V. Belyaev, and M. G. Tolstoi. Dec 65, 92p. Rept. no. FSTC-381-T65-694
TT 66-60473

Unclassified report

Trans. of mono. Proftekhizdat, n. p. 1962 p1-92.

Descriptors: (*Prefabricated buildings, Construction), (*Structural parts, Prefabricated buildings), USSR, Housing, Production, Ceramic materials, Plastics, Glass, Reinforced concrete, Walls, Floors, Roofs

Contents: new materials for prefabricated structures; keramzitobeton, plastics, glass, new prefabricated products and the methods used for their production; large reinforced concrete, closely ribbed, panels, voluminous prefabricated reinforced concrete components, prefabricated reinforced concrete products made in vertical cassettes; new methods of assembling buildings built of prefabricated components; assembly of prefabricated building components directly from transporting facilities ('off the wheels'), new method of assembling houses built of large panels (experience of sverdlovsk builders), new method of assembling houses built of large panels (experience of Leningrad builders), erection of houses by hoisting whole floors, assembly of structures with the aid of helicopters; basic features in construction of buildings in foreign countries.

AD-627 839 Fld. 13/13
CFSTI Prices: HC $2.00 MF $0.50
REPUBLIC AVIATION CORP FARMINGDALE N Y
A NONDIMENSIONAL APPROACH TO THE MINIMUM WEIGHT DESIGN OF HOT COMPRESSION STRUCTURE,
by Harold Switzky. 25 Jan 63, 46p. Rept. no. RAC-973 ,ARD-967-1
ASD TDR-62-763 ,13555

Unclassified report

Descriptors: (*Structures, Mathematical analysis), Experimental design, Optimization, Weight, High-temperature research, Loading (Mechanics), Stresses, Strain (Mechanics)

The design of hot compression structures is complicated by the various possible stress-strain relationships and structural configurations. A nondimensional design technique is presented in terms of geometric and material parameters which can readily be evaluated from known boundary conditions, type of construction, and stress-strain data. The design procedure for minimum weight is demonstrated for a heated truss-like spar. (Author)

AD-627 553 **See Fld. 20/11**

AD-627 597 **See Fld. 18/3**

AD-627 870 **See Fld. 18/3**

Field 14-METHODS AND EQUIPMENT

14/1. COST EFFECTIVENESS

AD-627 297 Fld. 14/1, 13/2, 12/2
CFSTI Prices: HC $3.00 MF $0.75
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY
AN INVESTMENT POLICY TO REDUCE THE TRAVEL TIME IN A TRANSPORTATION NETWORK.
Research rept.,
by Tony M. Ridley. Dec 65, 68p. Rept. no. ORC-65-34
Contract Nonr-222 (83) Proj. NR-047-033 ,RR-003-17-01

Unclassified report

Descriptors: (*Transportation, Cost effectiveness), (*Cost effectiveness, Transportation), (*Economics, Transportation), Topology, Traffic, Scheduling, Roads, Site selection, Combinatorial analysis, Operations research

The principal aim of a transportation study is to produce a plan for a future transportation network. This network should satisfy the traffic demands placed upon it and give service to users on the basis of some acceptable criteria within certain budgetary, political and social constraints. Out of a large number of engineering design problems which naturally arise, this dissertation considers a special problem of economic investment in a transportation network. (Author)

AD-627 611 Fld. 14/1, 5/1, 15/5
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
BUILDING A NEW FORCE STRUCTURE COST ANALYSIS MODEL,
by B. D. Bradley. Oct 65, 25p. Rept. no. RM-4764-PR
Contract AF49 (638)-700

Unclassified report

Descriptors: (*Air Force, Cost effectiveness), (*Cost effectiveness, Air Force), Management planning, Costs, Air force budgets, Air force equipment, Air force research, Air force personnel, Air force procurement, Logistics, Aircraft

A description of a new force structure cost analysis model being developed to advance the concept of force structure analysis and to facilitate its use in Air Force planning studies. The model is designed to incorporate non-weapon support activities and provide means for explicit analysis of their resource requirements. The concepts of the model and their use in the analytical process are discussed, as well as the definitional framework devised for it. This framework provides a two -dimensional description of the Air Force. The method by which the model will accomodate both planner and analyst is considered. (Author)

AD-627 886 Fld. 14/1, 12/2
CFSTI Prices: HC $3.00 MF $0.75
RAND CORP SANTA MONICA CALIF
ANNOTATED BIBLIOGRAPHY ON SYSTEMS COST ANALYSIS,
by P. A. DonVito. Feb 66, 70p. Rept. no. RM-4848-PR
Contract AF49 (638)-1700

Unclassified report

Descriptors: (*Cost effectiveness, Bibliographies), (*Operations research, Cost effectiveness), Department of Defense, Budgets, Systems engineering

A bibliography of unclassified literature on systems cost analysis, including books, pamphlets, articles, papers, and technical and research memoranda, giving the nature and content of each work. The titles are grouped into categories rep-

resenting broad areas of cost analysis and its application in the Department of Defense. (Author)

AD-628 011 Fld. 14/1, 5/1, 21/5
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
COST ESTIMATING RELATIONSHIPS FOR TURBOJET ENGINES.
Research paper (Master's thesis),
by Robert Earl Burkhart. Dec 65, 78p. Rept. no. GSM/SM/65-3

Unclassified report

Descriptors: (*Turbojet engines, Cost effectiveness), (*Cost effectiveness, Turbojet engines), (*Air Force procurement, Turbojet engines), Management engineering, Air Force

Cost estimating relationships for turbojet engine procurement costs are derived by the use of linear regression. The basis for this paper is the historical cost of 14 different model turbojet engines. Estimating relationships are developed for two cases; cumulative average engine cost, and cost per pound of engine. For the first case, specific fuel consumption was found to be the best explanatory variable. For the second case, specific weight proved to be the most suitable explanatory variable. The uncertainty associated with either estimating relationship is large because, in both cases, only about 75 percent of the variation in cost is explained. (Author)

14/2. LABORATORIES, TEST FACILITIES, AND TEST EQUIPMENT

AD-627 536 Fld. 14/2, 19/4
CFSTI Prices: HC $3.00 MF $0.75
INTERSTATE ELECTRONICS CORP ANAHEIM CALIF OCEANICS DIV
PROBE MEASUREMENTS OF UNDERWATER EXPLOSION BUBBLES (6-65, SCI).
Final rept.,
by Donald R. Bellows. Nov 65, 87p. Contract Nonr-4227 (00)

Unclassified report

See also AD-607 943.

Descriptors: (*Probes (Electromagnetic), Underwater explosions), (*Underwater explosions, Probes (Electromagnetic)), TNT, Shock waves, Bubbles, Electrical conductance, Measurement, Accelerometers

The report is an account of open-water testing of a prototype conductivity probe off the coast of San Clemente Island, California, using 300-pound charges of TNT. The measured maximum bubble radius was found to be about 17 feet and the measured first period about 570 milliseconds. Accelerometers mounted in the probe indicated that the displacement of the probe during the shot (i.e., during the first period of the bubble), was on the order of 1 foot along the axis of the probe. (Author)

AD-627 571 Fld. 14/2
CFSTI Prices: HC $2.00 MF $0.50
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
A THEORETICAL ANALYSIS OF THE DRIVER-RESERVOIR METHOD OF DRIVING HYPERSONIC SHOCK TUNNELS.
Technical note,
by Robert F. Flagg. Apr 65, 39p. Rept. no. UTIAS-TN-93
Contract AF33 (615)-2766

Unclassified report

Descriptors: (*Shock tubes, Pneumatic devices), (*Pneumatic devices, Operation), Analysis, Hypersonic flow, Canada, Nozzles, Time, Optimization

The driver-reservoir method of extending the test time of a tailored hypersonic shock tunnel by using a reservoir and a nozzle (perforated plate) at the upstream end of the driver is treated theoretically. It is shown that the flow following the rupture of the diaphragm is highly complex and contains both steady and unsteady flow regimes. It is also shown that the area ratio of the nozzle separating the driver from the reservoir determines the nature of the wave system produced. For a unique or 'ideal' nozzle area ratio a flow system is produced which contains no downstream running disturbances other than Mach waves. That is, both the head and the tail of the initial rarefaction wave are prevented from interfering with the shock-tunnel reservoir. Consequently, the running time of the shock tunnel can be extended. The ideal area ratios are calculated for a wide range of shock tunnel operating conditions and compared with experimental results. The comparison shows that the ideal nozzle area ratio can be predicted accurately from theory. (Author)

AD-627 710 Fld. 14/2
CFSTI Prices: HC $2.00 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD
NOL COPPER-BALL ACCELEROMETERS.
by Valmore F. DeVost. 31 Oct 65, 50p. Rept. no. NOLTR-63-279
Task RU35-00-000/W030A0-01-001

Unclassified report

Descriptors: (*Accelerometers, Shock (Mechanics)), Measurement, Copper, Spheres, Deformation, Crusher gages, Performance (Engineering)

The report describes a number of ball-crusher, peak-reading accelerometers and their application for recording simple as well as complex shocks. Some concepts on shock spectra, as they apply to these devices, and a new method for determining the peak of a shock recorded with preset copper-ball accelerometers are discussed. Ten accelerometer models cover a shock range from approximately 30 g to 450,000 g; their corresponding natural frequencies range from 244 cps to 14,800 cps. (Author)

AD-627 848 Fld. 14/2, 20/2
CFSTI Prices: HC $1.00 MF $0.50
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA PA
A VACUUM PATH X-RAY DIFFRACTOMETER FOR PRECISION RELATIVE LATTICE PARAMETER MEASUREMENTS ON SINGLE CRYSTALS,
by K. Kramer, R. Feder, and R. Dyer. Jan 66, 24p. Proj. DA-1C014501B11A
FA R-1792

Unclassified report

Descriptors: (*X-ray diffraction analysis, Instrumentation), (*Single crystals, X-ray diffraction analysis), Crystal lattices, Vacuum apparatus, Goniometers, Crystal holders, Potassium compounds, Chlorides, Aluminum

A vacuum path X-ray diffractometer designed for lattice parameter measurements on single crystals is described. It is an instrument of high precision approaching 1 part in 1,000,000 or better, and is also capable of moderately high accuracy of approximately 1 part in 100,000. The instrument is conceptually a variation of an earlier design but various factors are introduced to facilitate convenient experimental conditions. Scanning is automatic and provision is made on the instrument for a large working volume to accommodate auxiliary environmental equipment for the specimen. The mounting and measurement procedure is described and a sample calculation of lattice parameter with associated accuracy and precision is given. A discussion of the errors encountered in high precision measurements of this type concludes the report. (Author)

AD-627 911 Fld. 14/2, 20/3
CFSTI Prices: HC $1.00 MF $0.50
MASSACHUSETTS INST OF TECH CAMBRIDGE
ANALYSIS AND DESIGN OF AN IMPROVED CIOFFI INTEGRATOR.
Technical rept.,
by R. C. Callarotti. Jan 66, 19p. Rept. no. TR-2
Contract Nonr-3963 (16) Proj. NR-039-087

Unclassified report

Descriptors: (*Magnetic fields, Measurement), (*Fluxmeters, Design), Theory, Magnetometers, Integrators, Galvanometers

The various techniques for flux measurement are summarized. The response of the ballistic galvanometer is examined in detail. The operations of R-C integrators, operational amplifiers with capacitive and inductive feedback are analyzed. The Cioffi-type integrator, which combines inductive and positive resistive feedback with operational amplification and which uses a galvanometer for the first stage of DC amplification, is analyzed in detail. The characteristics of galvanometer and amplifiers are taken into account, and general solutions for the response of the integrator obtained. The design for an improved Cioffi-type integrator with AC amplification and photocell detection of the galvanometer imbalance is described. (Author)

AD-628 030 Fld. 14/2
CFSTI Prices: HC $1.00 MF $0.50
CHEMICAL RESEARCH AND DEVELOPMENT LABS EDGEWOOD ARSENAL MD
A METHOD OF DATA REDUCTION FOR THE BATTELLE CI-S-8 IMPACTOR.
Rept. for Jan 64,
by Merrill E. Milham. Jun 65, 17p. Rept. no. CRDLR-3279
Proj. DA-1C522301A081 Task 1C522301A08101

Unclassified report

Descriptors: (*Particle size, Statistical analysis), Samplers, Aerosols, Collecting methods

This report presents a method of statistical analysis for particle-size data obtained with the Battelle CI-S-8 impactor. The equations developed in this report give a simplified method for determining the least-squares fit for data represented by a log-normal distribution function. Mathematical equations include: (1) computation of the slope and intercept, (2) transformation substitutions, (3) general results, and (4) application to the Battelle impactor. A sample calculation is given in the appendix. (Author)

AD-628 031 Fld. 14/2
CFSTI Prices: HC $3.00 MF $0.75
ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN
EVALUATION OF THE ALBEDO INTEGRAL FOR MARK I,
by Cork H. Link Jr.. Feb 66, 68p. Rept. no. AEDC-TR-65-202
Contract AF40 (600)-1200

Unclassified report

Descriptors: (*Programming (Computers), Albedo (Astronomy)), (*Albedo (Astronomy), Space simulation chambers), (*Space simulation chambers, Albedo (Astronomy)), Illumination, Integrals, Integration, Computers

This report is concerned with the development of a fast computer method for evaluating the albedo integral. This integral defines the illumination on an arbitrarily oriented surface element at any point in space about a diffusely reflecting sphere. It enters the calculation of simulation control parameters in the Arnold Engineering Development Center Aerospace Environmental Chamber (Mark I). The seminumerical method developed here is faster than ordinary numerical integration by a factor of about ten. A typical computer program,

which formerly required about thirty minutes, now produces the same results in under four minutes. (Author)

AD-627 271 See Fld. 9/5

AD-627 323 See Fld. 4/1

AD-627 346 See Fld. 7/4

AD-627 430 See Fld. 13/12

AD-627 462 See Fld. 18/4

AD-627 467 See Fld. 20/11

AD-627 501 See Fld. 7/4

AD-627 519 See Fld. 11/4

AD-627 567 See Fld. 18/4

AD-627 572 See Fld. 4/2

AD-627 610 See Fld. 20/4

AD-627 670 See Fld. 21/6

AD-627 777 See Fld. 20/3

AD-627 824 See Fld. 20/3

AD-627 826 See Fld. 7/3

AD-627 977 See Fld. 11/6

AD-628 013 See Fld. 13/8

14/4. RELIABILITY

AD-627 305 Fld. 14/4, 12/1
CFSTI Prices: HC $2.00 MF $0.50
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH MATHEMATICS RESEARCH LAB
ON CONFIDENCE LIMITS FOR THE RELIABILITY OF SYSTEMS,
by Janet Myhre, and San C. Saunders. Nov 65, 40p. Rept. no. D1-82-0489 ,Mathematical Note-435

Unclassified report

Also available from the author.

Descriptors: (*Statistical analysis, Reliability), Performance (Engineering)

An application of the asymptotic Chi-square distribution of the log-likelihood ratio is made to obtain approximate confidence intervals (or interval estimates) for the reliability of any structure of the class of structures which can be represented by a monotone Boolean function of Bernoulli variates. This is for the case when the data available consists of a number of Bernoulli trials for the performance or non-performance of the components. Some special methods are obtained for a subclass of structures which contain those which fail if, and only if, a certain prescribed number of their components fail. This generalizes the results of A. Madansky (AD-609 429) for series, parallel and series-parallel systems. Computational procedures are given and some numerical studies are reported which assess how accurate the confidence intervals are as a function of the sample size. Some comparisons are made with exact results in the cases where they are known. (Author)

AD-627 434 Fld. 14/4, 12/2
CFSTI Prices: HC $2.00 MF $0.50
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH MATHEMATICS RESEARCH LAB
SOME INEQUALITIES FOR RELIABILITY FUNCTIONS,
by Z. W. Birnbaum, and J. D. Esary. Oct 65, 27p. Rept. no. D1-82-0379 ,Mathematical Note-431

Unclassified report

Also available from the authors.

Descriptors: (*Reliability, Probability), (*Inequalities, Probability), Functions, Failure (Mechanics), Maintenance, Performance (Engineering)

For the class of coherent binary systems the inequality h' (p) > or = h (p) (1 - h (p))/ (p (1-p)) has been previously proven, where p = component reliability, h (p) = system reliability; hence h' (p) = rate of change of system reliability as a function of component reliability. In the present study essential improvements of this inequality are obtained under the assumption that n = number of components, and one or both of the following parameters are known: the 'length' of the system, i.e. the smallest number of components such that their functioning assures the functioning of the system, and the 'width' of the system, i.e. the smallest number of components such that if they fail the system must fail. The usefulness of these results is due to the fact that in practice n, length, and width are often known although the system is so complex that a study of some of its details for reliability purposes may be prohibitive. An immediate application of such inequalities is that when it is known that for component reliability P0 the system has attained reliability h (P sub 0) = P sub 0, then a lower bound can be given for the system reliability h (p) for all P > or = P sub 0. (Author)

AD-627 654 Fld. 14/4, 9/5, 12/2
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
BOUNDS ON SYSTEM RISK FUNCTIONS INDUCED BY SUBSYSTEMS,
by Marvin Blum, and Ralph Deutsch. Feb 66, 22p. Rept. no. P-3299

Unclassified report

Descriptors: (*Systems engineering, Reliability), (*Optimization, Systems engineering), Statistical functions, Performance (Engineering), Management planning, Probability, Operations research

System performance can be measured by means of loss functions and risk functions. Inequalities are derived which provide upper and lower bounds on the total system risk function in terms of the more readily evaluated individual sybsystem risk functions. Bounds are given for the cases in which the members of an arbitrary collection of interconnected subsystems are either statistically independent or dependent in operation. (Author)

AD-627 799 Fld. 14/4, 12/1, 16/4
CFSTI Prices: HC $1.00 MF $0.50
PICATINNY ARSENAL DOVER N J
A MONTE CARLO METHOD FOR DETERMINING LOWER CONFIDENCE LIMITS FOR SYSTEM RELIABILITY ON THE BASIS OF SAMPLE COMPONENT DATA,
by Donald S. Orkand. Jun 60, 22p. Rept. no. ORDBB-VC-4

Unclassified report

Descriptors: (*Reliability, Systems engineering), (*Monte Carlo method, Systems engineering), (*Weapon systems, Reliability), Statistical analysis, Management planning

A Monte Carlo method is presented for the determination of the lower confidence limit for the estimated reliability of a complex network of components (e.g., a guided missile, adaption kit, or other weapon system) when the only data available for estimating system reliability are sample failure data for each component. This method can be easily adapted to the particular circuitry of a specific system and can be utilized even in the case where sample sizes vary sharply from component to component. A method of solution is indicated for the general case in which the reliability of each component in the system is dependent upon the functioning of other components in the system and where the sample data are in either binomial or variable form. A detailed solution is shown for the case of component independence where the sample data for each component are in binomial form, e.g., 1 failure out of 100, 2 failures out of 400, etc. A numerical solution for a simple circuit is also shown and the result compared to that obtained from an analytical solution. The agreement between the two is shown to be good. (Author)

AD-628 043 Fld. 14/4
CFSTI Prices: HC $1.00 MF $0.50
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF
A METHOD FOR COMPUTING SERIES SYSTEM RELIABILITY WITH UNEQUAL COMPONENT SAMPLE SIZES.
Technical rept. for Jun-Dec 65,
by J. R. Borsting, and W. M. Woods. Jan 66, 12p. Rept. no. TR-62
Proj. 46058 Task 88432

Unclassified report

Descriptors: (*Weapon systems, Reliability), (*Guided missile components, Reliability), Reliability (Electronics), Failure (Electronics), Sampling, Naval equipment, Statistical analysis

A method is presented for constructing system reliability using component failure data when the sample sizes for testing on the component parts differ greatly. The procedure can be applied to weapons systems as easily as subsystems. No assumptions about failure distributions are made. The accuracy of the procedure was examined by computer simulations and in this manner the procedure has demonstrated high accuracy for cases of practical interest. (Author)

AD-627 311 See Fld. 11/3

AD-627 602 See Fld. 22/2

14/5. REPROGRAPHY

AD-627 266 Fld. 14/5, 20/5
MICHIGAN UNIV ANN ARBOR
SYNTHETICAL METHODS IN ELECTRO-OPTICAL SCIENCE.
Semi-Annual rept.,
by George W. Stroke. Oct 65, 36p. Contract Nonr-1224 (54)

Unclassified report

Availability: Published in Physics Letters v18 n2 p116-8 15 Aug 1965. Nature v208 n5016 p1159-62 18 Dec 1965. AGARD Proceedings, N. A. T. O. Meeting, Paris, France 6-9 Sep 1965. Copies to DDC users only.

Descriptors: (*Photographic techniques, Lasers), (*Optical images, Synthesis), Electrooptics, Light, Phase modulation, Interferometers, Amplitude modulation, Photographic images, Resolution, Fourier analysis

Three papers are included; their titles are: Optical image synthesis (complex amplitude addition and subtraction) by holographic Fourier transformation; Reconstruction of phase objects by holography; Electro-optical image synthesis and communications by holographic (wave front-reconstruction) methods.

AD-627 899 Fld. 14/5, 15/7
CFSTI Prices: HC $4.00 MF $1.00
SCOPE INC FALLS CHURCH VA
APPLICATION OF TIME-DOMAIN ANALYSIS TO PRENORMALIZATION OF RECONNAISSANCE PHOTOGRAPHY.
Final technical rept., 19 Jun 64-23 Jul 65,
by Malcolm R. Uffelman, and Warren L. Holford. Jan 66, 146p. Contract AF30 (602)-3454 Proj. AF-6244 Task 624408
RADC TR-65-301

Unclassified report

Descriptors: (*Pattern recognition, Photointerpretation), (*Photointerpretation, Pattern recognition), (*Photographic reconnaissance,

Pattern recognition), (*Aerial reconnaissance, Photointerpretation), Automation, Adaptive systems, Photographic intelligence, Optical scanning

This is a study of the Integral-Scan Parameter-Scan Parameter-Generator and electrical property filtering in determining unique target signatures. The report includes the details of the construction and operation of an improved integral scanner with adjustable property filters, and presents an evaluation of the scannerprocessor system using aerial target imagery. A brief experimental evaluation of the integral-scan, time domain prenormalizer was conducted. The test results obtained indicate that the measurements made by the prenormalizer are descriptive of the imagery under view and that the measurements have a high degree of invariance to translation and rotation. (Author)

AD-627 916 Fld. 14/5
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
STUDY OF THE DEVELOPING PROPERTIES OF 1-PHENYLPYRAZOLIDONE-3 AND ITS DERIVATIVES. I. SUPERADDITIVE EFFECT OF PHENIDONE WITH VARIOUS DEVELOPING COMPOUNDS,
by V. L. Abritalin. Dec 65, 9p. Rept. no. FSTC-381-T65-663
TT 66-60495
Unclassified report

Trans. of Zhurnal Nauchnoi i Prikladnoi Fotografii i Kinematografii (USSR) v9 n5 p333-6 1964.

Descriptors: (*Photographic chemicals, Effectiveness), Pyradines, Ketones, Phenols, USSR

The superadditive effect of phenidone (1-phenyl-3 -pyrazolidone) with various developing compounds more frequently used in photographic practice was studied. Studied as basic developing compounds were: adurole (chlorhydroquinone), amidole (2,4-diaminophenol hydrochloride), hydroquinone, glycine (p-oxiphenylglycine), methole (monomethyl-p-aminophenol), p-aminophenol, p-phenylenediamine, pyrocatechol and pyrogallol. It is shown that a superadditive effect of phenidone is found chiefly with developing compounds containing at least two oxigroups in the molecule (exception – glycine, one oxigroup). (Extracted)

AD-627 917 **See Fld. 8/2**

Field 15-MILITARY SCIENCES

15/1. ANTISUBMARINE WARFARE

AD-627 524 Fld. 15/1, 8/10, 20/1
CFSTI PricesMF $1.00
NAVAL OCEANOGRAPHIC OFFICE WASHINGTON D C
OCEANOGRAPHY AND UNDERWATER SOUND FOR NAVAL APPLICATIONS.
Oct 65, 138p. Rept. no. SP-84
Unclassified report

Available from U. S. Naval Oceanographic Office, Washington, D. C. HC$0.75, CFSTI MF$1.00.

Descriptors: (*Antisubmarine warfare, Oceanology), (*Oceanology, Antisubmarine warfare), (*Underwater sound, Sound transmission), (*Sound transmission, Underwater sound), Oceanographic data, Instruction manuals, Naval training

This special publication presents information on the relationship of the oceanographic environment and underwater sound to antisubmarine warfare. The effects of the environment and underwater sound on vehicles, equipment, and weapons is discussed in simple terms. A glossary of terms and a list of references is included. (Author)

15/2. CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL WARFARE

AD-627 291 **See Fld. 15/6**

AD-627 842 **See Fld. 6/15**

AD-627 873 **See Fld. 6/20**

15/3.1 ANTIMISSILE DEFENSE

AD-627 407 Fld. 15/3.1
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
ANALYTIC EXPRESSIONS FOR THE PROBABILITY OF PENETRATING A POINT DEFENSE.
Technical rept.,
by Girard L. Ordway, and Henry M. Rosenstock. 1 Nov 58, 38p. Rept. no. APL/JHU-TG-352
Contract NOrd-7386
Unclassified report

Prepared in cooperation with Operations Research, Inc., Silver Spring, Md. rept. no. ORI-TR-54.

Descriptors: (*Guided missile defense systems, Vulnerability), (*Aerial warfare, Guided missile defense systems), Probability, Mathematical models, Penetration, Kill probabilities, Guided missiles (Surface-to-air), Transformations (Mathematics), Attrition

A method is developed for computing the probability that an air attack will penetrate a point defense made by a surface-to-air missile system. Analytic expressions are obtained from a model for the probability of penetration by at least one of k attackers, as a function of k and of the spacing between successive attackers, the number of shots that can be made at an approaching attacker, and the single-shot kill probability of the defensive missiles. The model is initially formed in terms of a constant spacing between attackers, but modifications are found that permit a generalization to obtain results for any spacing between attackers. The mean number of attackers required for penetration can be approximated very closely by a formula that is valid throughout the range of tactical interest. The number of attackers required to saturate the defensive capabilities and to ensure penetration is shown to be only slightly greater than the mean. (Author)

15/5. LOGISTICS

AD-627 265 Fld. 15/5
CFSTI Prices: HC $1.00 MF $0.50
DECISION STUDIES GROUP PALO ALTO CALIF
DETECTING DEMAND CHANGES.
Technical rept.,
by Peter W. Zehna. Dec 65, 24p. Contract Nonr-4457 (00) Proj. NR-347-001
Unclassified report

Descriptors: (*Replacement theory, Mathematical prediction), (*Inventory control, Decision theory), Inventory analysis, Economics, Feedback, Stochastic processes, Mathematical models

A periodic review inventory system is viewed as a servomechanism in which the input is demand and the output is the inventory level. Undwr the assumptions that lead time is fixed and demand is random, an order rule is determined which minimized the long run average inventory. The order rule allows for any method of forecasting future demands and completely determines the operating doctrine for each such method. Graphical portrayal is used to illustrate the essential features of the model in a servomechanism setting. Special cases, in which mean demand is specified and exponential smoothing is adopted as a forecasting technique are examined in detail. In particular, one of these examples treats of the case where an item changes from a slow mover to a moderately fast to fast mover. (Author)

AD-627 448 Fld. 15/5
CFSTI Prices: HC $3.00 MF $0.50
RAND CORP SANTA MONICA CALIF
UNIFYING RESOURCE ALLOCATION, CONTROL, AND DATA GENERATION: AN APPROACH TO IMPROVED BASE-LEVEL MAINTENANCE MANAGEMENT,
by I. K. Cohen, O. M. Hixon, and R. L. Van Horn. Nov 65, 58p. Rept. no. RM-4778-PR
Contract AF49 (638)-700
Unclassified report

Descriptors: (*Management control systems, Maintenance), (*Logistics, Inventory control), Scheduling, Air force operations

This is part of a continuing study concerned with maintenance management at base level. The memorandum suggests making the current system of base maintenance management more effective by strengthening Maintenance Control, improving its information system, decision aids, communication nets, display boards, scheduling rules, job-monitoring techniques, and other tools used in short-run resource allocation. Especially emphasized is the value of an event-dominated information system (in which the most knowledgeable sources report events important to Management Control as they occur). By instituting these changes, the Air Force could alleviate some problems associated with short-run maintenance management, and thereby increase weapon-system effectiveness. (Author)

AD-627 644 Fld. 15/5
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
A SYSTEM APPROACH TO BASIC STOCKAGE OF RECOVERABLE ITEMS,
by G. J. Feeney, and C. C. Sherbrooke. Dec 65, 46p. Rept. no. RM-4720-PR
Contract AF49 (638)-1700
Unclassified report

Descriptors: (*Inventory analysis, Stock level control), (*Stock level control, Inventory analysis), Probability, Distribution (Economics), Logistics, Inventory control, Maintenance, Air force procurement, Armed forces supplies

The concluding Memorandum in a series (AD-605 515, -613 470, -615 261) describing a system approach to setting base stock levels on recoverable items. Application of the system approach is demonstrated and its advantages indicated: (1) a Bayesian procedure, using data on all items in the supply system, to provide improved demand estimates for individual items; (2) a system cost-effectiveness curve displaying realistic alternatives; (3) a mechanism for examining sensitivity to parameter changes; and (4) comparison of different stockage policies. (Author)

AD-627 650 Fld. 15/5
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
MAINTAINABILITY, RELIABILITY AND AVAILABILITY.
Master's thesis,
by Howard Leroy Barden. Dec 65, 88p. Rept. no. GRE/MATH/65-1
Unclassified report

Descriptors: (*Maintainability, Specifications), (*Weapon systems, Maintenance), Reliability, Abundance, Reliable (Electronics), Sampling, Sequential analysis, Test methods, Statistical distributions, Bibliographies

Following a complete discussion of the problems associated with the definition and quantification of maintainability, it is argued that maintainability is not the equipment parameter to be specified and achieved without regard to other performance parameters. It is proposed in this thesis that inherent availability is the critical parameter to be specified and met by an aircraft weapon system contractor. It is further proposed that a series of availability tests be conducted to reflect a progressively decreasing consumer's risk and allow for increased system performance resulting from increased human experience and engineering improvements. A sequential sampling plan is designed for an exponential or a Weibull distribution of times-between-maintenance and times-to-repair. A hypergeometric sampling plan is presented for use in testing the operational readiness of the test fleet for any given proposed squadron size. (Author)

AD-628 010 Fld. 15/5, 19/6
CFSTI Prices: HC $5.00 MF $1.00
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
THE CONCEPTUAL PHASE OF WEAPON SYSTEMS ACQUISITION, A PARTIAL ANALYSIS.
Master's thesis,
by James Thomas Shearon, and Charles RobertSterrett. Aug 65, 184p. Rept. no. GSM/SM/65-20

Unclassified report

Descriptors: (*Weapon systems, Air Force research), (*Air Force research, Weapon systems), Advanced weapons, Air Force equipment, Systems engineering, Air Force equipment

The main activity of the Conceptual Phase is concerned with planning and defining requirements for future military systems. This activity occurs primarily between the initiation of AFSC's Technological War Plan (TWP) and the issuance, by USAF, of a Specific Operational Requirement (SOR). Inputs from DOD, USAF commands, etc., which provide basic data for the TWP are discussed. An analysis of each event and activity between the TWP and SOR, excluding RTD development activities, is presented to include purpose, who does it, how it is done, and appropriate references. Several findings, primarily concerning lack of documentation and non-standard terminology, are given. (Author)

AD-627 295 See Fld. 12/2

AD-627 326 See Fld. 5/9

AD-627 384 See Fld. 5/2

AD-627 389 See Fld. 5/4

AD-627 611 See Fld. 14/1

15/6. NUCLEAR WARFARE

AD-627 291 Fld. 15/6, 15/2, 6/21
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
OFFENSIVE WEAPONS AND THEIR EFFECTIVENESS,
by Harold L. Brode. Dec 65, 23p. Rept. no. P-3278

Unclassified report

Descriptors: (*Mass destruction weapons, Threat evaluation), (*Nuclear weapons, Threat evaluation), (*Biological warfare agents, Threat evaluation), Area coverage, Casualties, Damage, Warfare, Vulnerability

After a brief consideration of the possibilities of toxic biological agents, the bulk of this report deals with nuclear weapons.

AD-627 857 Fld. 15/6, 18/3
CFSTI Prices: HC $2.00 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD AIR/GROUND EXPLOSIONS DIV
YIELD OF THE HIROSHIMA WEAPON,
by Kenneth F. Caudle. 27 Dec 65, 32p. Rept. no. NOLTR 65-143

Unclassified report

Descriptors: (*Nuclear explosions, Explosion effects), (*Explosion effects, Nuclear explosions), Airburst, Pressure, Nuclear explosion damage, Japan

The airborne microphone gage pressure record of the Hiroshima shot is used to determine the yield of the Little Boy weapon. The geometry of the Hiroshima mission is reconstructed and analyzed to determine the slant range between the burst point and the canister along which the shock traveled. The height of burst, slant range and peak pressure are used in the Naval Ordnance Laboratory-Nonhomogeneous Atmospheric Transmission code to determine the energy yield of the Hiroshima weapon. The result of this analysis is a plot of weapon yield as a function of slant range for the peak pressure observed at Hiroshima. The yield of the Hiroshima weapon, based on the slant range determination in this report, is 15.2 kt. This result should be of interest to those concerned with physical vulnerability analyses based on Hiroshima data. Some discussion is given on other methods of finding the yield of the Hiroshima weapon. (Author)

15/7. OPERATIONS, STRATEGY, AND TACTICS

AD-627 402 Fld. 15/7, 5/10
CFSTI Prices: HC $1.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
A STUDY OF A PROBLEM IN TACTICAL JUDGMENT,
by R. M. Hanes. 18 Feb 60, 16p. Rept. no. TG-359
Contract NOrd-7386

Unclassified report

Descriptors: (*Decision making, Military tactics), (*Military tactics, Radar operators), Simulation, Performance tests, Radar targets

When given the same instructions (equal emphasis on speed and accuracy), experienced radar operators took longer to make their decisions, that is, they used longer target paths, than did the inexperienced ones. When additional emphasis was placed on speed of action, the experienced radar operators reduced significantly the length of path on which they based their decisions without any accompanying increase in errors. The inexperienced operators failed to take action on more targets than did the experienced operators. Even after considerable familiarity with the patterns of the raids, the inexperienced operators apparently still found the action a bit too fast. Both experienced and inexperienced operators had lower error percentages for incorrect action under the free-choice conditions of the present study than they did in the controlled-choice situation of a previous experiment employing the same problem materials. On valid targets (those intersecting a given criterion circle), experienced operators made error percentages varying from about 15-20 percent, for courses very close to the criterion circle, to zero for courses that were very nearly radial. On invalid targets, error percentages varied from 60-75 percent, for courses very close to the criterion circle, to about 18 percent for those well outside the criterion circle. (Author)

AD-627 411 Fld. 15/7, 5/10
CFSTI Prices: HC $1.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
TEAM VERSUS INDIVIDUAL PERFORMANCE IN TACTICAL JUDGMENT,
by R. M. Hanes, and J. M. Borchers. 14 Jun 60, 10p. Rept. no. TG-367
Contract NOrd-7386

Unclassified report

Descriptors: (*Decision making, Group dynamics), (*Military tactics, Radar operators), Performance tests, Simulation, Radar targets

Three two-man teams of inexperienced operators were tested under conditions where the two team members worked together on the same scope. Their performance was compared with that of individual operators, both experienced and inexperienced, and with that of hypothetical teams in which individuals worked independently on different scopes. Results of these comparisons suggest that the two-man team of inexperienced operators working together on one scope can: (1) Perform more effectively than inexperienced individual operators, and just about as well as experienced individual operators. (2) Perform very nearly as well as two-man teams in which each operator works independently on his own scope. (Author)

AD-627 444 Fld. 15/7, 13/10.1
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
COURSE, DEPTH, SPEED. MODERN WEAPONS AND TACTICS,
by R. Zhuyko. 1964, 8p. Rept. no. Translation-951
TT 66-60446

Unclassified report

Trans. of Krasnaya Zvezda (USSR) 28, 29 May 1963.

Descriptors: (*Undersea warfare, Military tactics), (*Submarines, Military tactics), USSR

AD-627 442 See Fld. 4/2

AD-627 680 See Fld. 17/4

AD-627 707 See Fld. 8/6

AD-627 899 See Fld. 14/5

Field 16-MISSILE TECHNOLOGY

16/1. MISSILE LAUNCHING AND GROUND SUPPORT

AD-627 613 See Fld. 21/8

AD-627 927 See Fld. 4/1

16/4. MISSILES

AD-627 799 See Fld. 14/4

Field 17-NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17/1. ACOUSTIC DETECTION

AD-627 383 Fld. 17/1, 20/1, 9/1
CFSTI Prices: HC $1.00 MF $0.50
NAVY UNDERWATER SOUND REFERENCE LAB ORLANDO FLA

AIR-COMPENSATED AUDIO TRANSDUCERS FOR OPERATION TO 500-FOOT DEPTH.
Research rept.,
by T. A. Henriquez. 7 Feb 66, 8p. Rept. no. USRL-80

Unclassified report

Descriptors: (*Electroacoustic transducers, Underwater sound equipment), (*Underwater sound equipment, Electroacoustic transducers), Deep submergence, Sonar equipment, Pneumatic devices

A system that enables gas-compensated electrodynamic transducers to be used at depths to 500 feet is described. The mechanical and acoustic characteristics are compared with those of the unmodified transducers. (Author)

AD-627 645 Fld. 17/1, 9/4
CFSTI Prices: HC $3.00 MF $0.75
RAND CORP SANTA MONICA CALIF
DETECTION OF SONAR SINUSOIDS OF UNKNOWN FREQUENCY AND KNOWN OR UNKNOWN PHASE,
by F. S. Hill,Jr.. Dec 65, 75p. Rept. no. RM-4809-ARPA
Contract SD-79 ,ARPA Order-189-61

Unclassified report

Descriptors: (*Sonar, Guided missile detection), (*Guided missile detection, Guided missiles (Underwaterto-surface)), Frequency, Phase detectors, Radar, Noise, Signal-to-noise ratio, Hydrophones, Sonar signals, Submarines

The problem of detecting a constant sine wave of unknown frequency and amplitude in gaussian noise is discussed. It is assumed that the sinusoid may appear at any one of a finite number of known frequencies, and the probability of its occurrence at each of these frequencies is assumed to be equal. Two cases are treated. The first assumes that the frequency is not known and the phase of the signal is known, allowing coherent detection. The second acknowledges that the initial phase indeed could not be known, and an analysis of the incoherent detector is made. For large output signal-to-noise ratios the problem in both cases becomes that of detecting one of m approximately orthogonal signals in a noise background. The magnitude of the error in the orthogonality approximation is considered. A physical relaization of an approximately optimum detector structure is studied in some detail, and the effect of finite observation time is considered. The results indicate that the difference between the two cases is small and quite predictable. It can be assumed that the initial phase is known, the gaussian character of the quantities that arise may be retained, and finally, the answers can be adjusted to account for the actual lack of knowledge concerning the phase. (Author)

17/2. COMMUNICATIONS

AD-627 316 Fld. 17/2
CFSTI Prices: HC $1.00 MF $0.50
MELPAR INC FALLS CHURCH VA
A SPECTROGRAPHIC STUDY OF FORMANT TRACKING,
by S. Joseph Campanella. 1962, 16p. Contract AF33 (600)-39962

Unclassified report

Descriptors: (*Speech, Analysis), Synthesis, Speech recognition, Spectrum analyzers, Speech compression

The Speech Microscope has been employed to analyze both original speech and the corresponding synthetic speech events for the initial stop consonants /b/ and /d/ in a variety of vowel settings. For the speaker selected, this analysis detected evidence of the existance of locii for the second formant transitions which are distinctly different for the two consonants. The cause of misinterpretation of the corresponding synthetic speech events produced by formant tracking system under test on the part of a group of listeners is traceable to distortion of the second formant transition. For example, a rather positive transformation in the perception of the consonant /d/ to /b/ for the vowel setting /i/ was traced to a lowering of the origin of the second formant transition for /d/ to the vicinity characteristic of that for /b/. The results are preliminary, the investigation involving only a single speaker. They are presented because they exhibit the method of analysis being employed, and indicate the significance of formant structure in speech perception and the importance of accurate preservation of this structure to the synthetic speech event. (Author)

AD-627 320 Fld. 17/2, 20/1
CFSTI Prices: HC $5.00 MF $1.00
SPERRY RAND RESEARCH CENTER SUDBURY MASS
EVALUATION OF SPEECH PROCESSING DEVICES. I. INTELLIGIBILITY, QUALITY, SPEAKER RECOGNIZABILITY.
Final rept. 1 Jun 64-31 Jul 65,
by William D. Voiers, Marion F. Cohen, and Juozas Mickunas. 31 Jul 65, 169p. Rept. no. SRRC-RR-65-94
Contract AF19 (628)-4195 Proj. AF-4610 Task 461002
AFCRL 65-826

Unclassified report

Descriptors: (*Voice communication systems, Effectiveness), (*Speech transmission, Effectiveness), (*Speech, Scientific research), Speech recognition, Acoustics, Acoustic properties, Linguistics, Analysis of variance, Digital systems, Standards

Three bases of evaluation are dealt with: intelligibility, speaker recognizability and aesthetic acceptability or quality. A two-choice diagnostic rhyme test for the transmission of consonant information has been developed. It yields a total intelligibility score plus diagnostic scores relating to the fidelity with which seven binary attributes of consonant phonemes are transmitted to the ear of the listener. These attributes are voicing, nasality, duration and frication (as opposed to plosion) i.e., front (as opposed to middle) middle (as opposed to back) and back (as opposed to front). For treating the problem of speaker recognizability, procedures have been developed by means of which listeners' ratings of voices on various perceived acoustic traits can be analyzed to predict speaker recognizability under any given transmission condition. The problem of evaluating the aesthetic acceptability or quality of transmitted speech is treated by means of the standard unit-variance method. Primary emphasis is placed upon the contributions of the channel to the quality of the received speech. However, the method is adaptable for purposes of studying qualitative variation attributable to the source (i.e., the speaker). (Author)

AD-627 544 Fld. 17/2, 9/4
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES ELECTRONIC SCIENCES LAB
A GEOMETRICAL STUDY OF TRANSMITTED REFERENCE COMMUNICATION SYSTEMS,
by R. M. Gagliardi. 26 May 64, 7p. Contract AF-AFOSR-496-64
AFOSR 65-2118

Unclassified report

Availability: Published in IEEE Transactions on Communication Technology vCOM-12 n4 p118-23 Dec 1964. Copies to DDC users only.

Descriptors: (*Communication systems, Data transmission systems), Optimization, Multipath transmission, Signal-to-noise ratio, Mathematical analysis

Digital communication systems utilizing wideband carriers require a coherent reference for optimal data processing. This reference may be either locally generated or transmitted simultaneously with the data. The latter system completely avoids the synchronization problem of locally generated reference systems but is degraded by the fact that two receivers are required, excess system dimension must be used, and the transmitter power is diluted by having to transmit the reference. This report is a study of a general transmitted reference (TR) system, with the primary objective of finding bounds on these restrictions. It is based upon geometrical considerations using the fact that a transmitted reference system can be described by vectors in, and linear transformations upon, an N-dimensional Euclidean space. In this way it can be shown, for example, that the dimension of the transmitting channel must be greater that that of the space of carrier signals for unique operation. This increase in dimension need be only slight in the noiseless case, but an advantage is gained by increasing the dimension in noisy operation. An equivalent expression for output SNR is obtained in terms of norms of signal vectors and a comparison is made with that of a locally generated reference (LGR) system. (Author)

AD-627 589 Fld. 17/2
CFSTI Prices: HC $1.00 MF $0.50
MELPAR INC FALLS CHURCH VA
A 1000 BIT PER SECOND SPEECH COMPRESSION SYSTEM,
by S. Joseph Campanella, D. C. Coulter, and R. Irons. 1963, 5p. Contract AF33 (600)-39962

Unclassified report

Descriptors: (*Speech compression, Sound reproduction systems), Speech, Synthesis, Sound pitch, Sound signals, Digital systems, Signal-to-noise ratio, Information theory

The system exploits the speech bandwidth compression capabilities of the method known as formant tracking to provide digitized communication of speech at a rate of 1000 bits per second. The system derives a set of seven parameters from the original speech signal which contain the essential word content information of speech. The seven parameters consist of three formant frequencies, three formant intensities and the frequency of pitch. In their analog form they occupy 140 cps of bandwidth. The parameters are digitized into a 23 bit code word that is sampled at a 43.5 cps rate to provide a 1000 bit per second serial digital stream. At the receiving end of the system the serial binary stream is decoded and converted to synthetic speech. A discussion of the information theory of speech compression systems is included with the conclusion that the system will possess a 13db signal to noise advantage over conventional uncompressed speech transmission systems, an advantage that will result in significant size, weight and power requirements reduction. (Author)

AD-627 674 See Fld. 13/9

AD-627 762 See Fld. 9/5

AD-627 924 See Fld. 9/2

17/2.1 RADIO COMMUNICATIONS

AD-627 357 Fld. 17/2.1, 9/4, 22/2
CFSTI Prices: HC $2.00 MF $0.50
LINCOLN LAB MASS INST OF TECH LEXINGTON
THE EFFECT OF PSEUDORANDOM FREQUENCY HOPPING ON THE PROBABILITY OF SIMULTANEOUS USAGE OF A COMMUNICATION SATELLITE.
Technical Note,
by John U. Beusch. 22 Dec 65, 32p. Rept. no. TN-1965-56

Contract AF19 (628)-5167 Proj. AF-649L
ESD TDR-65-590

Unclassified report

Descriptors: (*Communication satellites (Active), Information theory), (*Information theory, Communication satellites (Active)), Radio relay systems, Radio antijamming, Frequency shift, Synchros, Frequency, Synchronization (Electronics)

When the up-link frequency band repeated by a communications satellite is hopped in a periodic manner, when users are divided so that a group of them can transmit only when a particular frequency band is repeated, and when message arrivals for one user are independent of message arrivals for any other user, the users in a group are independent. When the frequency hopping is done in a pseudorandom rather than a periodic manner, the users are dependent. The effect of the dependence is, in practical cases, to increase the probability of there being a large number of simultaneous users which increases the probability of system overload. General expressions for the probability of system overload and for the fraction of the information lost due to overload are obtained. These expressions illustrate the effect of the dependence induced by the pseudorandom frequency hopping. Examples are presented. (Author)

AD-627 452 Fld. 17/2.1, 9/4, 22/2
CFSTI Prices: HC $2.00 MF $0.50
INSTITUTE OF NAVAL STUDIES CAMBRIDGE MASS
CHANNEL CAPACITIES OF MULTIPLE/RANDOM ACCESS COMMUNICATIONS SATELLITE REPEATERS.
Final rept.,
by David B. Newman. May 65, 30p. Rept. no. INS-Research-Contribution-14
Contract Nonr-3732 (00)

Unclassified report

Descriptors: (*Communication satellites (Active), Information theory), (*Information theory, Communication satellites (Active)), (*Radio relay stations, Communication satellites (Active)), Multiplex, Limiters, Signal-to-noise ratio, Mathematical prediction

The channel capacity of a communication satellite repeater is of direct interest to all users in assessing how much service they may expect to obtain from a particular satellite or system. This is especially so when one considers that many users may attempt to gain access to a communication satellite simultaneously and without prior notice - the multiple and random access problem. The purpose of this paper is to present a method for estimating the channel capacities of various generic types of communication satellites which may be considered as alternates for successive generations of development. (Author)

AD-627 676 Fld. 17/2.1
CFSTI Prices: HC $2.00 MF $0.50
ITT FEDERAL ELECTRIC CORP PARAMUS N J
PREDICTING THE ELECTROMAGNETIC ENVIRONMENT AT A SITE.
Final engineering rept., suppl.
1966, 35p. Contract NObsr-91236 Proj. SF-0131504 Task 7876

Unclassified report

Descriptors: (*Radiofrequency interference, Mathematical prediction), Electronic equipment, Data, Compatibility, Determination

The report contains the step-by-step procedures for applying the technique to obtain a measurement of the electromagnetic environment at a site with a minimum of actual field measurement. This technique has been designed to be used to determine whether an equipment planned for installation at a site can be expected to encounter interference from distant (on or off-base) transmitters. It is based on signal intensity behavior as a function of calendar time and frequency and produces results in the form of 'the percentage of total time over the course of a year when the signal intensity for a given frequency received at a site, will be above a given level.' By knowing the threshold level of the particular equipment being considered for installation, it is possible to determine whether the signal intensity levels expected will present a significant problem and whether redesign efforts or other approaches for eliminating or reducing the interference are needed or desired. (Author)

AD-627 446 See Fld. 9/5

AD-627 796 See Fld. 22/3

AD-627 914 See Fld. 9/5

17/3. DIRECTION FINDING

AD-627 475 Fld. 17/3, 9/5, 13/10
CFSTI Prices: HC $4.00 MF $1.00
SOUTHWEST RESEARCH INST SAN ANTONIO TEX
A REVIEW AND ANALYSIS OF SHIPBOARD RADIO DIRECTION FINDING RESEARCH AT SOUTHWEST RESEARCH INSTITUTE BETWEEN 1955 AND 1965.
Task summary rept. no. 20,
by Douglas N. Travers, and W. M. Sherrill. 2 Aug 65, 135p. Contract NObsr-89167 Proj. SF-001801 Task 9258

Unclassified report

See also AD-615 172.

Descriptors: (*Direction finding, Radio equipment), (*Ship antennas, Direction finding), State-of-the-art reviews, Loop antennas, Site selection, Performance (Engineering), Ship structural components, Errors, Azimuth

A review of shipboard high frequency direction finding research at Southwest Research Institute is presented for the ten-year period ending in 1965. Problem factors as recognized prior to 1955 are listed with status for 1955 and 1965 given in tabular form. A more detailed description of the progress made in relation to each factor is also given. Proposed changes in the method of conducting future research are listed. Supporting detail for various aspects of the work are provided. (Author)

AD-627 693 Fld. 17/3
CFSTI Prices: HC $2.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
PASSIVE RADAR,
by A. G. Nikolaev, and S. V. Pertsov. Dec 65, 27p. Rept. no. FSTC-381-T65-681
TT 66-60470

Unclassified report

Trans. of mono. Passivnaya Radiolokatsiya, n.p. 1964 p147-71.

Descriptors: (*Direction finding, Radiometers), (*Radiometers, Direction finding), (*Radar, Passive), (*Passive, Radar), Phase measurement, Radiofrequency, Thermal radiation, USSR

Feasibility of radiothermal direction finders utilizing correlational radiometers.

17/4. ELECTROMAGNETIC AND ACOUSTIC COUNTERMEASURES

AD-627 680 Fld. 17/4, 15/7
CFSTI Prices: HC $1.00 MF $0.50
OPERATIONS EVALUATION GROUP WASHINGTON D C
EFFECTIVENESS OF IMPERFECT DECOYS,
by A. Hershaft. 3 Sep 65, 14p. Rept. no. Research Contribution-69
Contract Nonr-3732 (00)

Unclassified report

Descriptors: (*Decoys, Effectiveness), Military strategy, Probability, Operations research

Mathematical relations are developed to express the effectiveness of decoys in a situation which requires the attacker to assign his weapons on the basis of imperfect classification of the targets. The analysis considers the effects of a number of pertinent parameters, such as the number of real and decoy targets and the enemy's classification ability and missile effectiveness, and calculates the probabilities of survival of real targets. A number of hypothetical examples are given to illustrate the application of the theory to practical problems. (Author)

17/7. NAVIGATION AND GUIDANCE

AD-627 722 Fld. 17/7, 20/14, 4/1
CFSTI Prices: HC $2.00 MF $0.50
HOLMAN (JOHN F) CO INC WASHINGTON D C
THE METEOROLOGICAL PROBLEM OF ELECTRONIC MEASUREMENT OF DISTANCE,
by J. Mitter. Feb 66, 27p. Contract DA-44-009-AMC-930 (T) Proj. DA-4-A-623-501-A-852
AERDL T-1819-66 ,TT 66-60477

Unclassified report

Trans. of Acta Technica. Series Geodaetica et Geophysica (Hungary) v5 n1/2 p159-78 1964.

Descriptors: (*Distance-measuring equipment, Wave transmission), (*Range finding, Distance-measurement equipment), Electrooptics, Electronic equipment, Light, Microwaves, Propagation, Atmospheric refraction, Hungary

After a brief characterization of the presently employed electro-optical and electronic methods of measuring distance and the general conditions of propagation of their carrier waves in the atmosphere, the determination of the mean rate of propagation of the carrier waves is discussed. The latter is dependent on the possibility of determining the prevailing refraction coefficient which is a function of locus of the meteorological conditions along the wave path. The basic problem for light waves and microwaves lies in the possibility of determining the accurate mean temperature and/or, for the decimeter and centimeter waves, also in the possibility of determining the mean vapor pressure. So far, the determination of the meteorological data has been made only at the termini of the respective distances and close to the ground. It is based on the assumption of a practically linear structure of the meteorological field for all elements in the area of measurement. The structure of the temperature by day and by night both close to the ground and in the 'free' atmosphere and the additional influences due to motion of the air, topography and ground cover are discussed. (Author)

AD-627 878 Fld. 17/7
CFSTI Prices: HC $1.00 MF $0.50
GENERAL PRECISION INC LITTLE FALLS N J
PROGRAM PROGRESS REPORT NO. 35 FOR STELLAR ACQUISITION FEASIBILITY FLIGHTS (STAFF). VOLUME II. TECHNICAL.
15 Feb 66, 9p. Rept. no. GPI-311.1-1057
Contract AF04 (694)-327

Unclassified report

Descriptors: (*Celestial guidance, Instrumentation), (*Celestial navigation, Instrumentation), (*Guided missile tracking systems, Instrumentation)

AD-627 884 Fld. 17/7
CFSTI Prices: HC $4.00 MF $0.75
NAVAL OCEANOGRAPHIC OFFICE WASHINGTON D C
THE USE OF SECTOR RADIO-RANGE BEACONS IN SHIP NAVIGATION,
by Yu. K. Baranov. 1965, 107p. Rept. no. Trans-239
TT 66-60491
Unclassified report

Trans. of mono. Ispolzovanie Sektornykh Radio -Mayakov v Sudavozhdenii, Leningrad, 1958 88p.

Descriptors: (*Radar navigation, Position finding), (*Position finding, Radar navigation), (*Ships, Radar navigation), Radar beacons, Navigational aids, Range finding, Direction finding, Radar equipment, Tables, USSR

A radar navigational system of remote control which is called the sector radio-range beacon. (In foreign literature the system is called consol.) is at the present time used in navigation for the determination of a ship's location. The objective of the study is to acquaint the navigators with the operating principles of sector radio-range beacons, their tactical and technical data and the methods of determining the ship's location. The second edition of the study in the sector radio-range beacons has been considerably revised in comparison with the first edition and enlarged for the reason that new sector radio-range beacons have been developed during the last years, that a considerable experience has been gained in their utilization, and that new methods of calculating ship's location have been developed. The determination of the ship's location based on foreign and Soviet sector radio-range beacons is illustrated by examples. The tables of bearing presented in this study will also be applicable in the future provided that changes in wave length and other elements of the radio-range beacons do not occur. (Author)

AD-628 017 Fld. 17/7, 20/3, 20/6
CFSTI Prices: HC $2.00 MF $0.50
GPL DIV GENERAL PRECISION INC PLEASANTVILLE N Y
RESEARCH AND DEVELOPMENT PROGRAM ON OPTICALLY PUMPED NUCLEAR GYROSCOPE.
Quarterly rept. no. 2, 1 Oct-30 Dec 65,
by James H. Simpson, and John McKendry. 24 Jan 66, 28p. Rept. no. GPL-A-33-2
Contract NOw-65-0577-d
Unclassified report

See also AD-623 328.

Descriptors: (*Gyroscopes, Nuclear magnetic resonance), (*Nuclear magnetic resonance, Oscillators), (*Pumping (Optical), Mercury lamps), (*Mercury lamp, Pumping (Optical)), Radiofrequency oscillators, Solid state physics, Phase control devices, Amplifiers, Optics

The newly developed transistorized lamp exciter-oscillators have been tested in the gyro and shown to give gyro performance that is qualitatively the same as that previously obtained with the microwave-powered discharge lamps. Alternate techniques to air cooling have been considered for cooling the mercury discharge to prevent self reversal of the optical line 2537. Immersion cooling was tried. Although NMR signals were observed with the bulb in methanol, the increase in power required to drive the lamp and the deterioration of the liquid make this approach and material questionable for practical instrumentation. Search for a more suitable liquid will continue and other alternates will be sought. The requirements of a high-gain photosensitive device to be used in place of the combination of a low-gain photosensitive device plus a phase-stable amplifier have been determined. The possibility of getting a device with the required characteristics is being examined. (Author)

17/8. OPTICAL DETECTION

AD-627 350 Fld. 17/8, 20/6, 4/1
CFSTI Prices: HC $1.00 MF $0.50
WHITE SANDS MISSILE RANGE N MEX
EFFECTS OF ATMOSPHERIC TURBULENCE ON OPTICAL INSTRUMENTATION,
by Randolph A. Becker. 19 Jul 61, 17p. Rept. no. RID-O-TM-61-5
Unclassified report

Descriptors: (*Atmospheric motion, Optical phenomena), (*Optical phenomena, Atmospheric motion), Optical equipment, Optical tracking, Optical images, Distortion, Atmospheric refraction, Micrometeorology, Guided missile ranges, New Mexico

The results of research on optical turbulence at White Sands Missile Range are presented. It has been shown that elevating camera stations 33 feet above ground level can yield nearly a threefold increase in optical resolution during periods of atmospheric turbulence. Early research postulated the existence of thermal-induced air-lenses as the cause of optical turbulence effects. Recent research has shown that air-lenses can account for most of the observed effects. The 'prism' concept of turbulence appears to be unnecessary for explaining trubulence -induced image motion. The dependence of the optical effects of turbulence upon exposure time and aperture size is discussed qualitatively. The source of optical turbulence in the atmosphere and a method of measuring the trubulence-generating potential of various terrain surfaces are described on the basis of micrometerology. This research has been limited to an investigation of optical turbulence during the period from sunrise to sunset. However, many of the results apply to the nighttime turbulence encountered by astronomers. (Author)

AD-627 592 Fld. 17/8, 6/17
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AEROSPACE CREW EQUIPMENT LAB
DEVELOPMENT, PROCUREMENT, AND EVALUATION OF PRESCRIPTION SUNGLASSES,
by Rosalie Noble. 18 Sep 58, 23p. Rept. no. NAMC-ACEL-381 ,TED-NAM-AE-52117
Unclassified report

Descriptors: (*Eyeglasses, Aviation personnel), Solar radiation, Acceptability, Naval personnel, Naval equipment, Glass, Plastic lenses, Configuration

On the basis of the results of the questionnaire and informal discussions with some of the participants in this program of evaluation, a requirement and recommended design for sunglasses, both prescription and plano, are established. The sun and/or glare protection of the size lens used in the Navy experimental sunglasses is preferable to the smaller lens which is being specified by MIL-G-25948 (USAF). The more angular cut-away of the portion of the experimental lens in the nose-cheek immediate area is comfortable for a larger number of persons, including those who have high cheek bones and/or fleshy cheeks. (Author)

AD-627 664 Fld. 17/8, 1/3, 11/2
CFSTI Prices: HC $2.00 MF $0.50
GENERAL ELECTRIC CO JOHNSON CITY N Y LIGHT MILITARY ELECTRONICS DEPT
WIDE ANGLE OPTICAL PROJECTION SYSTEM.
Final research rept., pt. 3,
by N. Rosenberg. 31 Dec 65, 49p. Rept. no. LMEJ-7713
Contract Nonr-4514 (00)
Unclassified report

Descriptors: (*Display systems, Cockpits), (*Aspherical lenses, Reflectors), Optical glass, Ellipsoids, Optical equipment components, Tolerances (Mechanics), Precision finishing

An optical design study was undertaken with the objective of conceiving and proving feasibility of an optical system which would provide a 25 degree binocular field of view for a head-up cockpit display. This activity has been successfully completed and thoroughly documented in earlier reports. During this program it became apparent that additional study was necessary to determine the feasibility of achieving the ellipsoidal shaped components which are essential to the development and demonstration of this system. This report describes the many techniques which were investigated and evaluated. The main benefit derived from this activity is that the method for generating the ellipsoid component is now defined, and the course of future development activity may be planned in a realistic manner. (Author)

AD-627 671 **See Fld. 5/8**

17/9. RADAR DETECTION

AD-627 465 Fld. 17/9, 9/5
CFSTI Prices: HC $2.00 MF $0.50
LINCOLN LAB MASS INST OF TECH LEXINGTON
RADAR GROUND-CLUTTER SHIELDS.
Technical rept.,
by J. Ruze, F. I. Sheftman, and D. A. Cahlander. 19 Aug 65, 49p. Rept. no. TR-399
Contract AF 19(628)-5167 Proj. ARPA Order-498
ESD TDR-65-325
Unclassified report

Descriptors: (*Radar clutter, Electromagnetic shielding), (*Electromagnetic shielding, Radar clutter), Structures, Radar stations, L band, Radar antennas, Parabolic antennas, K band, Model tests, Mathematical analysis, Radar tracking, Performance (Engineering)

Metal shields (or fences) are useful in reducing the ground clutter received by a radar. The design of a clutter shield for an L-band radar employing a 60-ft parabolic reflector with Cassegrainian geometry is verified by scale-model measurements at K sub a-band. It is shown that a 100-ft fence, at a distance 500ft from the radar, will give a nominal one-way clutter reduction of 20db. Tracking is expected to be virtually unaffected down to about 7.8 degrees in elevation, but the low limit on useful performance is about 4.8 degrees. More than 10-db additional clutter reduction is achieved by cutting rectangular slots in the top edge of the fence. However, these and other periodic structures are subject to 'resonances' related to grating lobes. This phenomenon is investigated experimentally on the scale model and explained by a mathematical analysis utilizing the principle of stationary phase. A proposed nonperiodic edge treatment is expected to be free of this troublesome effect. (Author)

AD-627 528 Fld. 17/9, 9/5, 9/1
CFSTI Prices: HC $3.00 MF $0.50
MOTOROLA INC SCOTTSDALE ARIZ MILITARY ELECTRONICS DIV
INTEGRATED CIRCUITS FOR COMBAT AREA EQUIPMENT.
Quarterly progress rept. no. 1, 1 Feb-1 May 65,
by C. D. Shupe, and R. T. Paca. 1 May 65, 55p. Rept. no. WP-3081-1
Contract DA-28-043-AMC-01204 (E) Proj. DA-1P6-22001-A-056 Task 1P622001A05602
Unclassified report

Descriptors: (*Integrated circuits, Gate circuits), (*Gate circuits, Search radar), Filters (Electromagnetic wave), Switching circuits, Packaging, Design, Transistors, Resistors, Films, Range gating, Wiring diagrams

During this period the existing discrete component design of the Range Gated Filter was carefully analyzed and an integrated circuit, I/C, replacement

was developed. The I/C design was built in breadboard form using such integrated components as transistors and thin film resistors. The breadboard was tested to determine the electrical performance over the specified environmental conditions. Throughout the breadboard evaluation emphasis was placed on small size, low power consumption, reliability and simplicity with no compromise in performance. The final design was submitted to USAEC engineers for review and approval prior to initiation of Phase II which will be the development of the actual I/C chips comprising the Range Gated Filter. The final I/C Range Gated Filter units are estimated to represent a volumetric reduction of 4.3 to 1. (Author)

AD-627 615 Fld. 17/9, 20/14, 4/1
CFSTI Prices: HC $4.00 MF $1.00
TECHNICAL OPERATIONS INC BURLINGTON MASS
METEOROLOGICAL EFFECTS ON RANGE RATE ERRORS IN RADIO INTERFEROMETER TRACKING SYSTEMS: CAPE KENNEDY.
Final rept. 1 Aug 62-30 Sep 65,
by W. W. Vickers, C. G. Fain, J. H. Meyer, and R. Griffith. Oct 65, 129p. Rept. no. TO-B-65-104
Contract AF49 (628)-2912 ,AF19 (604)-6661
Proj. AF-5930 Task 593007
AFCRL 65-819
Unclassified report

Descriptors: (*Atmospheric refraction, Radio interference), (*Radio interference, Atmospheric refraction), (*Guided missile tracking systems, Radio interference), Radar tracking, Radio interferometers, Range finding, Errors, Guided missile ranges, Florida, Meteorological parameters, Atmosphere models

During past Mercury-Atlas shots from Cape Kennedy varying degrees of difficulty with noise were encountered in the General Electric, Mod III microwave interferometer tracking system. This noise was allegedly caused by variations in atmospheric structure and composition. Stratification of moist and dry layers and intrusions of moist air into dry air (upward penetration of cumulus clouds into dry air) apparently produced sufficient variation of medium to cause fluctuations in the interferometer tracking trace. The primary purpose of this study, therefore, has been to investigate the effects of atmospheric refraction anomalies on radio interferometer tracking systems and, ultimately, to be able to predict the relative magnitude of tracking errors resulting from atmospheric conditions. (Author)

AD-627 879 Fld. 17/9, 4/2
CFSTI Prices: HC $3.00 MF $0.75
MOTOROLA INC SCOTTSDALE ARIZ MILITARY ELECTRONICS DIV
VISTAR, A PULSE DOPPLER AIRBORNE WEATHER RADAR.
Final rept.,
by G. Kinzer. 20 Jan 64, 83p. Rept. no. WF-2923
Contract AF19 (628)-2382 Proj. AF-6672
Unclassified report

Descriptors: (*Meteorological radar, Doppler radar), (*Doppler radar, Meteorological radar), Airborne, Design, X band, Pulse transmitters, Coherent radar

The weather surveillance objectives for the VISTAR airborne weather radar are briefly described. The basic operational requirements for VISTAR are outlined and signal flow presented. Detailed system and circuit operation are given and calibration procedures noted. (Schematic drawings are not a part of this document.) Criticisms of the system are presented and recommendations given. A block diagram is included.

AD-627 932 Fld. 17/9, 9/5, 9/1
CFSTI Prices: HC $2.00 MF $0.50
MOTOROLA INC SCOTTSDALE ARIZ MILITARY ELECTRONICS DIV
INTEGRATED CIRCUITS FOR COMBAT AREA EQUIPMENT.
Quarterly rept. no. 2, 1 May-1 Aug 65,
by C. D. Shupe, and R. T. Paca. 1 Aug 65, 38p. Rept. no. WP-3081-2
Contract DA-28-043-AMC-01204 (E) Proj. DA-1P6-22001-A-022001-A-056 Task 1P622001A05602
Unclassified report

See also AD-627 528.

Descriptors: (*Integrated circuits, Gates (Circuits)), (*Gates (Circuits), Search radar), Filters (Electromagnetic wave), Switching circuits, Printed circuits, Range gating, Packaged circuits, Manufacturing methods, Processing, Transistors, Design

During the reporting period the mask layout was completed and the fabrication of the four individual I/C chips of the Range Gated filter was initiated. The mask layout criteria, the material selection criteria, and the subsequent processing sequences are outlined. Required capacitors for the initial production have been ordered and received. Orders have been placed for the printed circuit boards and connectors. (Author)

AD-627 934 Fld. 17/9
CFSTI Prices: HC $1.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
A POLYCHROMATIC RADAR,
by Isadore Katz, and Lee M. Spetner. 24 Oct 60, 23p. Rept. no. CF-2898
Unclassified report

Descriptors: (*Radar, Color), (*Radar reflections, Frequency), Terrain, Radar targets, Geometric forms

Extension of studies on terrain reflectivity have led to an investigation of the radar terrain cross sections as a function of the radiation wave length. The specific functional relationship between cross section and wave length depends on the type of the model one assumes. This suggests the possibility that different terrain surfaces may be distinguishable if one were to use several radar frequencies. At optical wave lengths, surfaces act as selective absorbers, hence they show characteristic color to the eye when illuminated with white light. If terrain surfaces act in a similar manner as selective absorbers at microwave frequencies, then this property, as well as the geometry of the surfaces, would result in a wave length dependence of the radar reflectivity. A multifrequency (polychromatic) radar is suggested as a piece of equipment which could be used on aircraft to aid in navigation. The exact wave-length dependence of a particular terrain type is converted into color on a color cathode ray tube. (Author)

AD-627 322 See Fld. 9/5

AD-627 436 See Fld. 6/7

AD-627 520 See Fld. 5/1

AD-627 538 See Fld. 20/14

AD-627 635 See Fld. 20/14

17/10. SEISMIC DETECTION

AD-627 373 See Fld. 8/11

AD-627 389 See Fld. 5/4

AD-628 023 See Fld. 8/11

Field 18-NUCLEAR SCIENCE AND TECHNOLOGY

18/2. ISOTOPES

AD-627 443 Fld. 18/2
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
AN ELECTROMAGNETIC MASS-SEPARATOR OF THE LABORATORY OF NUCLEAR REACTIONS,
by A. V. Demyanov, N. I. Tarantin, Yu. A. Dyachikhin, and A. P. Kabachenko. 1966, 19p.
Rept. no. Translation-2078
TT 66-60445
Unclassified report

Elektromagnitnyi Mass-Separator Laboratorii Yadernykh Reaktsii, trans. of mono. Obedinennyi Institut Yadernykh Reaktsii, Dubna, 1965 p1949.

Descriptors: (*Radioactive isotopes, Separation), (*Thallium, Radioactive isotopes), Electromagnets, USSR

The mass-separator, a description of which is given in the present work, was manufactured in the Laboratory of Nuclear Reactors at the Joint Institute of Nuclear Research in 1963-64, utilizing an electromagnet SP-57 A-1 of industrial manufacture. This mass-separator is intended for the separation of radio-active products, generated in nuclear reactors under the influence of fast heavy ions. Computation of the basic parameters of the mass-separator and the requirements which must be satisfied have been presented elsewhere (N. I. Tarantin and A. V. Dem'yanov. Preprint. Joint Institute of Nuclear Research, R-1948. Dubna, 1965). In the present work are given a description of the construction of the basic elements of the mass-separator, its ionic-optical characteristics, and the results of the first experiments in the separation of thallium isotopes.

AD-627 568 Fld. 18/2, 18/4
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
AN IODINE SOURCE FOR BETA COUNTING,
by Arnaldo A. Delucchi, and Allen E. Greendale.
15 Nov 65, 15p. Rept. no. USNRDL-TR-948
Contract AT (49-2)-1167
Unclassified report

Descriptors: (*Half life, Radioactive isotopes), (*Beta particles, Counting methods), (*Iodine, Sources), Iodine compounds, Silver compounds, Radiation measurement systems, Tin, Antimony, Tellurium

A simple, fast method is described for producing iodine sources weighing a fraction of a milligram that are useful for beta counting. This method gives high chemical yields and results in uniform sources having good physical and chemical stability. The method does not give good yields with thin films suitable for 4 pi-beta counting. However the lightness, uniformity, and stability of these sources should satisfy most 4 pi-beta counting requirements. (Author)

18/3. NUCLEAR EXPLOSIONS

AD-627 516 Fld. 18/3
CFSTI Prices: HC $4.00 MF $1.00
MRD DIV GENERAL AMERICAN TRANSPORTATION CORP NILES ILL
DESIGN PROCEDURES FOR SHOCK ISOLATION SYSTEMS OF UNDERGROUND PROTECTIVE STRUCTURES. VOLUME V. RESPONSE SPECTRA OF MULTI-DEGREE-OF-FREEDOM ELASTIC SYSTEMS.
Rept. for Nov 63-Jan 65,
by N. M. Newmark, W. H. Walker, and R. J. Mosborg. Dec 65, 126p. Contract AF29 (601)-6253
Proj. AF-5710 Task 13.167
RTD TDR-63-3096-vol-5
Unclassified report

Prepared in cooperation with Newmark, Hansen and Associates, Urbana, Ill.

Descriptors: (*Underground structures, Detonation waves), (*Detonation waves, Nuclear explosions), (*Vibration isolators, Detonation waves), Equation of motion, Integration, Tables, Shock (Mechanics), Beams (Structural)

A discussion is presented of maximum response for multi-degree-of-freedom elastic systems considering five-degree-of-freedom systems in some detail, with some results for ten-degree-of-freedom systems and other systems for which data are available in the literature. Included are tabulations of response data computed from step by step integration of the equations of motion for five different forms of ground excitation on a number of systems having varying parameters of mass and stiffness distribution. The results are compared with the modal responses for the same systems, and general rules are developed for comparing the true responses with various combinations of the modal response data. Consideration is given to treatment of a multi-degree-offreedom system as a continuous shear beam, and some generalizations are drawn from the study which enable a better interpretation of the results of the specific data tabulated in the report. Some suggestions arising from the studies reported in Vol. IV are made to take into account the behavior of multi-degree-of-freedom systems in the inelastic range. (Author)

AD-627 597 Fld. 18/3, 13/13
CFSTI Prices: HC $6.00 MF $1.25
GENERAL AMERICAN TRANSPORTATION CORP NILES ILL
DESIGN PROCEDURES FOR SHOCK ISOLATION SYSTEMS OF UNDERGROUND PROTECTIVE STRUCTURES. VOLUME II. STRUCTURE INTERIOR MOTIONS DUE TO DIRECTLY TRANSMITTED GROUND SHOCK.
Rept. for Nov 63-Jan 65,
by F. Finlayson, L. E. Fugelso, and Y. Shulman.
Dec 65, 209p. Contract AF29 (601)-6253 Proj. AF-5710 Task 13.167
RTD TDR-63-3096-Vol-2
Unclassified report

Descriptors: (*Detonation waves, Nuclear explosions), (*Vibration isolators, Detonation waves), (*Underground structures, Detonation waves), Equations of motions, Cylindrical bodies, Structural shells, Mathematical prediction, Motion, Shelters

This volume presents a method for estimating the motions on the interior of a buried cylindrical shell resulting from directly-induced ground shock caused by the detonation of a nuclear device to aid in the preliminary design of shock isolation equipment. Various theoretical models for calculating the free-field waveform are reviewed and the acoustic model is recommended for this purpose. The reasons for this recommendation are enumerated and the methods for applying it are given. Methods for solving the structure-medium-interaction problem are discussed and the normal-mode analysis of the response of an elastic cylindrical shell in an acoustic medium to a specified input pulse is reviewed in detail. A discussion of ranges of parameters appropriate to realistic problems is included. A thorough explanation of the results of computer solutions for the shell response is presented, and a large number of graphs illustrating the results are included. The results are analyzed to determine the relative influence of the parameters on interior shell motion. The application of the method developed is explained and illustrated by sample problems. An appendix contains a Duhamel-integral computer program that can be used to generate results for cases not included in this volume. (Author)

AD-627 870 Fld. 18/3, 13/13
CFSTI Prices: HC $6.00 MF $1.25
NEWMARK HANSEN AND ASSOCIATES URBANA ILL
DESIGN PROCEDURES FOR SHOCK ISOLATION SYSTEMS OF UNDERGROUND PROTECTIVE STRUCTURES. VOLUME IV. RESPONSE OF TWO-DEGREE-OF-FREEDOM ELASTIC AND INELASTIC SYSTEMS.
Technical rept.,
by N. M. Newmark, W. H. Walker, A. S. Veletsos, and R. J. Mosborg. 6p. Contract AF29 (601)-6253 Proj. AF-5710 Task 13.167
RTD TDR-63-3096-Vol-4
Unclassified report

Descriptors: (*Underground structures, Vibration isolators), (*Vibration isolators, Underground structures), Design, Elasticity, Plasticity, Shock (Mechanics), Explosion effects

The purpose of this study is to develop simple rules for the designer so that he may be able to predict the maximum responses of two-degree-of-freedom elastic and inelastic systems under various types of ground shock excitation. The true responses of two-degree-of-freedom systems both in the elastic range and in the inelastic range, when subjected to five different forms of ground excitation are compared with the modal response of the same systems. Simple expressions are given for linear two-degree-of-freedom mass and spring combinations from which modal parameters can be obtained. From these modal parameters, and the response spectra for one-degree-of-freedom systems for various excitations, as presented in Vol. III (AD-444 989) of this series of reports, one can determine bounds and probable values of the response. A detailed study is reported of a two-degree-of-freedom system subjected to a step velocity pulse at the base, having various combinations of elastic and inelastic response. In addition, a series of solutions of two-degree-of-freedom systems are presented for comparison with various approximate rules for determining bounds to the response in the various springs of the system. (Author)

AD-627 303 **See Fld. 18/8**

AD-627 323 **See Fld. 4/1**

AD-627 857 **See Fld. 15/6**

18/4. NUCLEAR INSTRUMENTATION

AD-627 462 Fld. 18/4, 14/2
CORNELL UNIV ITHACA N Y LAB OF ATOMIC AND SOLID STATE PHYSICS
SPECTRAL MEASUREMENTS WITH ALIGNED AND MISALIGNED TWO-CRYSTAL SPECTROMETERS. I. THEORY OF THE GEOMETRICAL WINDOW,
by Herbert W. Schnopper. 15 Jun 64, 11p. Contract AF 49 (638)-402 Proj. AF-9761 Task 976103
AFOSR 65-1987
Unclassified report

Availability: Published in Journal of Applied Physics, v36 n4 p1415-23 Apr 1965. Copies to DDC users only.

Descriptors: (*Nuclear radiation spectrometers, Alignment), (*X-ray spectroscopy, Measurement), Spectrum analyzers, Crystals, Calcite, X-rays, Errors

It is shown that (1) the geometrical window of the instrument is a function of the alignment of the crystals, the beam, and the rotation axes as well as the vertical divergence; (2) even for the case of perfect spectrometer alignment, errors are introduced into the measurement of the spectral parameters because of the presence of a finite vertical divergence in the x-ray beam; and (3) improper beam and crystal alignment cause inaccuracies in the measurement of spectral parameters. Calculations which predict the effects of vertical divergence and of beam and crystal misalignment on the geometrical window and also on the wavelength position, line shape, linewidth, and line asymmetry of the (1,+1) and (1,-1) curves are made for the case of CuK alpha radiation reflected from calcite crystals. In particular, it is shown that the error in the measurement of the Bragg angle is 6 to the 1/2 power times more sensitive to misalignment of the central ray of the x-ray beam than it is to total vertical divergence. (Author)

AD-627 567 Fld. 18/4, 14/2
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
DOSE RATE AND SPECTRAL MEASUREMENTS FROM PULSED X-RAY GENERATORS,
by Eugene Tochilin, and Norman Goldstein. 3 Dec 65, 29p. Rept. no. USNRDL-TR-939
Proj. DADA-NWETB-2 Task 06.518T
DASA 1703
Unclassified report

Descriptors: (*X-ray tubes, X-ray spectrum), (*Dosimeters, X-ray tubes), Pulse generators, Dose rates, Test methods, Films, Lithium compounds, Fluorides, Glass, Luminescence, X rays, Measurement, Van De Gruff generators

Typical X-ray spectra from high intensity pulsed X-ray sources were determined by means of an equivalent constant voltage accelerator. The photon energy spectrum for the forward X-ray beam was measured with various X-ray target thicknesses at accelerator voltages of 1.0, 1.5 and 2.0 Mv. X-ray spectra were also obtained from a reflection X-ray target an angles of 7 deg and 45 deg with respect to the X-ray beam at applied potentials of 0.55, 1.0 and 2.0 Mv. The dose rate dependence of thermoluminescent LiF, silver-activated phosphate glass, and dosimetry film was investigated over a range of dose rates extending from 10,000 to 10 to the 11th power rad/sec with three separate flash X-ray systems. (Author)

AD-627 586 Fld. 18/4, 13/10.1
CFSTI Prices: HC $1.00 MF $0.50
NAVAL SUBMARINE MEDICAL CENTER GROTON CONN MEDICAL RESEARCH LAB
LOW LEVEL ALPHA COUNTING: DESCRIPTION OF A DEVICE FOR INCREASING COUNTING EFFICIENCY ABOARD SUBMARINES,
by Richard M. Swengel. 7 Jun 65, 18p. Rept. no. 453
NAVMED MR005.14-3002-4.20
Unclassified report

Descriptors: (*Alpha particles, Counting methods), (*Submarines, Radiation measurement systems), (*Radiation measurement systems, Submarines), Scintillation counters, Radiation monitors, Design

The design and use of a new device for increasing low level Alpha counting efficiency of the standard AN/PDR-56 Alpha Particle Meter is described. Directions for its construction, list of materials required, photographs and diagrams are furnished. The practical application of shipboard utilization of such a device is pointed out. (Author)

AD-627 930 Fld. 18/4, 11/8
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
GERMANIUM (LITHIUM) DETECTOR FABRICATION,
by James M. Mathiesen, and John P. Hurley. 9 Dec 65, 32p. Rept. no. USNRDL-TR-949
Proj. SR-011-01-01 Task 0401
Unclassified report

Descriptors: (*Nuclear radiation spectrometers, Semiconductors), (*Semiconductors, Manufacturing methods), Germanium, Processing, Doping, Lithium, Gamma-ray spectroscopy, Radiation measurement systems, Photoelectric materials

Techniques for the manufacture of Ge (Li) detectors are described. A step-by-step description is given for each of the procedures in the fabrication of a Ge (Li) detector, including germanium preparation, lithium diffusion, lithium drift, and test and evaluation. The necessary materials and equipment are also listed together with their availabilities. The text is augmented with detailed diagrams. Finally examples are given of gamma-ray pulse height spectra which have been recorded with a Ge (Li) detector. (Author)

AD-627 568 See Fld. 18/2

18/6. RADIATION SHIELDING AND PROTECTION

AD-627 807 Fld. 18/6, 18/9
CFSTI Prices: HC $5.00 MF $1.00
HARRY DIAMOND LABS WASHINGTON DC
THE RADIATION ENVIRONMENT IN THE EXPERIMENTAL FACILITIES OF THE DIAMOND ORDNANCE RADIATION FACILITY,
by Philip G. Berman. 1 Dec 65, 154p. Rept. no. TR-1307
Proj. HDL-29023
Unclassified report

Descriptors: (*Test reactors, Neutron flux), (*Neutron flux, Test reactors), (*Gamma rays, Test reactors), Dosimeters, Neutron detectors, Gamma counters, Radiation damage, Measurement, Reactor operation

Neutron fluence, fluence per kilowatt-hour, gamma ray exposure and gamma ray exposure rate were measured at the Harry Diamond Laboratories' Diamond Ordnance Radiation Facility. The data are presented in graphical form to facilitate their use. The maximum attainable radiation exposure measured in the pulse mode is as follows: in the exposure room the neutron fluence (E> 10 kev) is 6.8 x 10 to the 13th power n/sq. cm. and the gamma ray exposure is 500,000 R; in the pool the neutron fluence is 5.2 x 10 to the 13th power and the gamma ray exposure 300,000R. The maximum attainable radiation exposure rate, measured at a reactor power level of 250 kw, is as follows: in the exposure room the neutron fluence (E> 10 kev) is 5.4 x 10 to the 12th power n/sq. cm. sec. and the gamma ray exposure is 2,100 R/sec; in the pool the neutron flux is 8.0 x 10 to the 11th power n/sq cm. sec. and the gamma ray exposure is 1,300 R/sec. (Author)

AD-627 515 See Fld. 6/3

AD-627 584 See Fld. 18/9

AD-627 585 See Fld. 18/9

AD-627 890 See Fld. 13/2

18/8. RADIOACTIVITY

AD-627 303 Fld. 18/8, 18/3, 6/18
CFSTI Prices: HC $2.00 MF $0.50
ARMY MEDICAL RESEARCH LAB FORT KNOX KY BIOPHYSICS DIV
BASE LINE ENVIRONMENTAL RADIATION LEVELS-INCLUDING MORATORIUM AND POST-MORATORIUM VALUES--ON THE FORT KNOX RESERVATION,
by Wordie H. Parr, Gordon M. Lodde, and Dailey W.McPeak. 27 Sep 65, 34p. Proj. DA-3A014501B71P Task 3A014501B71P04
USAMRL 635
Unclassified report

Descriptors: (*Nuclear explosions, Radioactivity), (*Radioactive fallout, Nuclear explosions), (*Radiological contamination, Environment), Radiobiology, Soils, Water, Air, Radiation monitors, Sampling, Radiation measurement systems, Graphics, Kentucky, Military facilities

An environmental radioactivity study was conducted for the first time on the Fort Knox Reservation for the purpose of establishing base line radiation levels. Comparisons of radiation levels during and after the nuclear moratorium (Jan 1960 - Jan 1963) are reported. Air samples were collected in the laboratory area during the normal work week, whereas water, silt, and soil samples were routinely collected at monthly intervals from strategic locations. Description of sampling procedures and radioactivity measuring techniques are included. Activity measurements on the Reservation show that radiation levels are influenced by world-wide nuclear detonations. Low and relatively steady levels are correlated with the moratorium, while fluctuating but increasing values accompanied the resumption of the nuclear testing programs. (Author)

AD-627 605 Fld. 18/8, 9/1, 22/1
CFSTI Prices: HC $3.00 MF $0.75
LINCOLN LAB MASS INST OF TECH LEXINGTON
SPACE RADIATION EFFECTS ON HIGH GAIN LOW CURRENT SILICON PLANAR TRANSISTORS.
Group rept. (Revised ed.),
by Alan G. Stanley. 25 Oct 65, 85p. Rept. no. GR-1965-11
Contract AF19(628)-5167 Proj. AF-649L
ESD TDR-65-506
Unclassified report

Revision of manuscript submitted 9 Feb 65.

Descriptors: (*Transistors, Space environmental conditions), (*Radiation damage, Transistors), Silicon, Solid state physics, Performance (Engineering), Gain

The availability of silicon planar transistors with DC gains up to 300 at 10-microamps collector current has made it possible to design circuits with very low power consumption. By irradiating a number of commercial types with 1.5 Mev electrons in different circuit configurations, they were shown to be rather susceptible to space radiation. The most sensitive parameters are leakage current and low current gain. The effect on saturation voltages and on matching characteristics of transistor pairs was found to be minor, as long as the DC gain did not fall below 10. Under prolonged irradiation at electron fluxes representative of the inner Van Allen belt most transistor types had leakage currents considerably less than 100nA at emitter-collector biases not exceeding 10V. A few types exhibited leakage currents as high as 500 microamps A due to the formation of surface channels. A total doese of 10 to the 15th power e/sq cm reduced the DC gain in the 5- to 10-microamps A range of most to the transistors to values between 5 and 20. The gain after irradiation was governed by recombination-generation in the base-emitter region, but did not depend significantly on the pre-irradiation gain. Encapsulation of the transistor chip in a dense plastic material proved to be an effective method of preserving the gain under irradiation with a minimum penalty in weight and volume. (Author)

AD-627 992 Fld. 18/8
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
NEUTRON GENERATOR,
by V. A. Emelyanov, and L. I. Beskin. 5 Nov 65, 5p. Rept. no. FTD-TT-64-719
TT 66-60499
Unclassified report

Unedited rough draft trans. of Patent (USSR) 154 623, appl. 795596/22-3, 21 Sep 62.

Descriptors: (*Neutrons, Sources), Alpha particle reactions, Beryllium, Patents, USSR

A neutron generator is discussed which contains a coaxially located immovable cylinder with beryllium targets and a cylinder with an alpha radiator which has the distinguishing feature that for the purpose of accomplishing the work of the generator in a pulse system in it there is used an immovable cylinder with an alpha radiator and a movable cylindrical screen with openings made along its generatrices coaxially located between the cylinder with the alpha radiator and the one with the beryllium targets. (Author)

AD-627 392 See Fld. 20/12

AD-627 393 See Fld. 20/12

AD-627 670 See Fld. 21/6

AD-627 759 See Fld. 4/1

AD-627 788 See Fld. 11/6

18/9. REACTOR ENGINEERING AND OPERATION

AD-627 584 Fld. 18/9, 18/6
CFSTI Prices: HC $7.40 MF $2.00
ALLIS-CHALMERS MFG CO MILWAUKEE WIS ATOMIC ENERGY DIV
AIR FORCE NUCLEAR ENGINEERING TEST FACILITY: SAFEGUARDS REPORT, VOLUME I. TEXT.
Aug 63, 442p. Rept. no. ACNP-62599-Vol-I
Unclassified report

See also AD-627 585.

Descriptors: (*Nuclear engineering, Air force research), (*Air Force, Test facilities), (*Nuclear reactors, Safety), Radiation hazards, Radiation shielding, Site selection, Reactor cores, Thermal radiation, Containment, Reactor coolants, Cooling, Radioactive waste, Disposal, Accidents, Tests

The potential of nuclear energy as a primary and secondary power source for many types of advanced Air Force weapons systems has long been recognized. High -intensity gamma and neutron radiation produces a stringent environment that materials, components, and systems must be able to withstand. The requirement to operate in such an environment has created a rapidly growing number of research and engineering problems whose solutions are urgently needed. In nearly all cases, research and engineering tests that will provide the solutions require magnitudes and kinds of nuclear radiation that only a nuclear reactor can supply. The construction of the Air Force Nuclear Engineering Test Facility (AF-NETF), currently nearing completion at the Aeronautical Systems Division (ASD), Wright-Patterson Air Force Base (W-PAFB), Dayton, Ohio, was undertaken both to contribute to those solutions and to support basic nuclear research. The report describes the facility and analyzes the hazards associated with its operation during the criticality and power-demonstration phase (including full -power operation) before its final acceptance for operation by the Air Force. (Author)

AD-627 585 Fld. 18/9, 18/6
CFSTI Prices: HC $5.00 MF $1.00
ALLIS-CHALMERS MFG CO MILWAUKEE WIS ATOMIC ENERGY DIV
AIR FORCE NUCLEAR ENGINEERING TEST FACILITY: SAFEGUARDS REPORT. VOLUME 2. FIGURES.
Aug 63, 188p. Rept. no. ACNP-62599-Vol-2
Unclassified report

See also AD-627 584.

Descriptors: (*Nuclear engineering, Air force research), (*Air Force, Test facilities), (*Nuclear reactors, Safety), Radiation hazards, Radiation shielding, Site selection, Reactor cores, Thermal radiation, Containment, Reactor coolants, Cooling, Radioactive waste, Disposal, Accidents, Tests

AD-627 807 See Fld. 18/6

AD-627 892 See Fld. 9/2

AD-627 969 See Fld. 9/2

Field 19-ORDNANCE

19/1. AMMUNITION, EXPLOSIVES, AND PYROTECHNICS

AD-627 649 Fld. 19/1
CFSTI Prices: HC $2.00 MF $0.50
NAVAL AMMUNITION DEPOT CRANE IND
PROPOSED KINETICS AND MECHANICS OF ILLUMINANT FLARES; MAXIMIZING EFFICIENCY,
by Duane M. Johnson. 13 Jan 66, 46p. Rept. no. RDTR-32

Unclassified report

Descriptors: (*Flares, Illumination), Dynamics, Optimization, Flames, Burning rate, Magnesium, Sodium compounds, Nitrates, Spectroscopy, Temperature, Reaction kinetics, Binders, Physical properties, Oxidizers

By the use of physical mechanisms and chemical kinetics, proposed to be representative of phenomena occurring in magnesium - sodium nitrate - organic binder flare flames, several characteristic effects, observed in connection with the efficiency of this type of flame, are explained. A means of investigating various oxidizers and developing new binders is presented and verification of the means is indicated. The effect of formulation changes and flare-diameter on the spectral distribution of the flare emissions is illustrated and the probable cause of the observed changes in spectral distribution is given. The definition of the optimum burning rate is given and supporting reasoning, through physical and chemical means, is given for why an optimum rate exists in illumination flare. The drastic reduction in the efficiency of a flare operating at high altitudes is likewise explained. The various effects of sodium, both observed and proposed, are discussed. (Author)

AD-627 846 Fld. 19/1
CFSTI Prices: HC $2.00 MF $0.50
PICATINNY ARSENAL DOVER N J EXPLOSIVES LAB
RADIATION-ENHANCED SURFACE ACTIVITY OF GAMMA HMX,
by Thomas C. Castorina, Jerome Haberman, and Andrew F. Smetana. Feb 66, 30p. Proj. DA-1C014501A32B-01
PA TR-3282

Unclassified report

Descriptors: (*HMX, Radiation damage), (*Explosive materials, Radiation damage), Surface properties, Tracer studies, Absorption, Water vapor, Nitrogen compounds, Oxides, Pyrolysis

The surface activity of one-micron particle size gamma - octahydro - 1,3,5,7 - tetranitro-s-tetrazine (gamma -HMX) is enhanced by cobalt-60 gamma irradiation. Surface activity was measured by a radiometric determination of adsorption of carbon-14 labeled stearyl trimethyl ammonium bromide (STAB) from solution. At doses ranging from 5 to 60 Mrads, the enhanced surface activity is shown to be related to dose and the evolution of composite gaseous products derived from bulk as well as surface molecules. Although a one-Mrad irradiation of gamma-HMX in vacuo produces no change in surface activity, such as irradiation of gamma-HMX in contact with water vapor results in an enhancement of surface activity that is comparable to the effect of a 15-Mrad dose. Exposure of gamma-HMX to NO2 and NO increases surface activity by 28% and 42%, respectively; irradiation of these samples with one Mrad gives no additional enhancement. The increased rate of thermal decomposition is not specific to radiation-enhanced surface activity promoted by water vapors but is found to be a function of gamma-ray interaction with bulk molecules as well. However, the increased rates of thermal decomposition of unirradiated samples of gamma-HMX exposed to NO and NO2 are attributed solely to thermally unstable reaction products of NO-HMX and NO2-HMX surface adducts. (Author)

AD-628 034 Fld. 19/1, 20/9
CFSTI Prices: HC $6.00 MF $1.25
ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF
STUDIES OF ELECTRICALLY EXPLODING WIRES AND FILMS. I. STUDIES OF CROSSED-FIELD PLASMA ACCELERATORS AND PLASMA DIAGNOSTIC TECHNIQUES. II.
Final summary rept. 1 Apr 61-30 Sep 65,
by Norman C. Chase, and Donald P. Duclos. Oct 65, 210p. Rept. no. EOS-1690-Final
Contract AF49 (638)-1063 Proj. AF-9752 Task 975201
AFOSR 65-0154

Unclassified report

Descriptors: (*Exploding wires, Films), (*Plasma accelerators, Crossed field devices), Probes (Electromagnetic), Plasma medium, Proton beams, Electric propulsion, Rocket propulsion

Contents: Backstrap plasma accelerator; Apparatus and instrumentation; Effects of expellant velocity distribution on rocket performance; Investigation of a confined exploding wire propulsive means; On the acceleration of spheres by one-dimensional non-uniform gas flows; Low -pressure crossed-field plasma accelerator; Proton beam technique for measuring ion density; Ac low -pressure crossed-field plasma accelerator; High -pressure crossed-field plasma accelerator.

19/3. COMBAT VEHICLES

AD-627 817 Fld. 19/3, 5/5
CFSTI Prices: HC $3.00 MF $0.75
HUMAN ENGINEERING LABS ABERDEEN PROVING GROUND MD
HUMAN ENGINEERING SURVEY OF M-48 TANK.
Technical memo.,
by Evan Charney, Anthony J. Rose, and Louis T. Lee. 7 Mar 56, 84p. Rept. no. TM-16
Proj. TB1-1000

Unclassified report

Descriptors: (*Tanks (Combat vehicles), Human engineering), (*Human engineering, Tanks (Combat vehicles)), Design, Military personnel, Operators (Personnel)

The purpose of the study was to find out from the user what significant human engineering problems with the M-48 tank were being encountered. In addition, an attempt was made to discover field expedients employed by the crewmen to solve these problems and to elicit any suggestions for pertinent design improvements on the tank. Thus, the liaison team has attempted to serve as a middleman, to inform the human engineering research personnel and designers what difficulties the users are having with equipment that the Ordnance Corps created for them. It is the opinion of the liaison team that, on the whole, the troops are well satisfied with the performance and handling of the tank. (Author)

AD-627 818 Fld. 19/3, 5/5
CFSTI Prices: HC $1.00 MF $0.50
HUMAN ENGINEERING LABS ABERDEEN PROVING GROUND MD
HUMAN ENGINEERING PROBLEMS OF THE ARMORED PERSONNEL CARRIERS T113 AND T117.
Technical memo.,
by Albert S. Bacon, Donald R. Cronk, and Anthony J. Rose. Nov 57, 23p. Rept. no. TM-10-57
Proj. TB1-1000

Unclassified report

Descriptors: (*Human engineering, Vehicles), (*Armored vehicles, Human engineering), (*Passenger vehicles, Human engineering), Military personnel

The report consists mainly of recommendations for improvement of the vehicles.

AD-627 819 Fld. 19/3, 5/5
CFSTI Prices: HC $2.00 MF $0.50
HUMAN ENGINEERING LABS ABERDEEN PROVING GROUND MD
DYNAMIC HUMAN ENGINEERING EVALUATION OF THE ARMORED PERSONNEL CARRIERS T113 AND T117.
Technical memo.,
by James P. Torree Jr., and Georges R. Garinther. Aug 58, 33p. Rept. no. TM-7-58
Proj. TB1-1000

Unclassified report

Descriptors: (*Human engineering, Vehicles), (*Armored vehicles, Human engineering), (*Passenger vehicles, Human engineering), Military personnel, Design, Noise, Communication systems, Configuration

This evaluation was conducted to uncover human engineering design deficiencies and to note areas in which the vehicles proved adequate from a human engineering standpoint. Findings indicated necessity for more intensive investigation. Primary investigation was done in: (1) sound measurement and analysis within vehicles with full complement of personnel; (2) effects of noise on audition, communication, and performance; (3) effects of vehicle configuration and design on crew performance, safety, and comfort; (4) crew's opinion on 1, 2, and 3 above. (Author)

AD-627 820 Fld. 19/3, 5/5
CFSTI Prices: HC $1.00 MF $0.50
HUMAN ENGINEERING LABS ABERDEEN PROVING GROUND MD
HUMAN FACTORS ENGINEERING EVALUATION OF THE M60 MAIN BATTLE TANK.
Tecnhical memo.,
by Kermit D. Foster. Jun 60, 16p. Rept. no. TM-8-60

Unclassified report

Descriptors: (*Tanks (Combat Vehicles), Human engineering), (*Human engineering, Tanks (Combat Vehicles)), Ordnance laboratories, Tracked vehicles, Armored vehicles, Performance (Engineering), Man-machine systems

This study reports the results of an evaluation of the M60 Tank from a human factors engineering standpoint. The report is primarily concerned with noise evaluation and crew area evaluations to determine their conformity with human factors design practices. (Author)

AD-627 821 Fld. 19/3, 5/5
CFSTI Prices: HC $2.00 MF $0.50
HUMAN ENGINEERING LABS ABERDEEN PROVING GROUND MD
A HUMAN FACTORS EVALUATION OF THE MAIN BATTLE TANK, 105MM GUN, M60E1.
Technical memo.,
by Gene L. Brown. Jun 62, 36p. Rept. no. TM-14-62

Unclassified report

Descriptors: (*Tanks (Combat vehicles), Human engineering), (*Human engineering, Tanks (Combat vehicles)), Maintenance, Military personnel, Operators (Personnel)

The workspace available to each crew member in relation to his task and the efficiency of maintenance operation including proper utilization of available tools, skills, and supplies were investigated. (Author)

19/4. EXPLOSIONS, BALLISTICS, AND ARMOR

AD-627 801 Fld. 19/4
CFSTI Prices: HC $.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON DC
HYPERVELOCITY PROJECTION TECHNIQUES AND IMPACT STUDIES JANUARY 1959-JUNE 1960.
Memo. rept.,
by W. W. Atkins, and S. M. Halperson. Nov 60, 33p. Rept. no. NRL-MR-1116
Proj. NR-503 000

Unclassified report

Descriptors: (*Light gas guns, Feasibility studies), (*Hypervelocity projectiles, Terminal ballistics), (*Terminal ballistics, Hypervelocity projectiles), Impact shock, Projectors (Ordnance), Aluminum, Tungsten compounds, Carbides, Lead, Steel, Copper, Cratering

A program was initiated to obtain terminal ballistic data for masses up to five grams starting at velocities of 4.6 km/sec and extending into the hypervelocity region as far as possible. Terminal ballistic data was obtained using aluminum and tungsten carbide projectiles at velocities from near zero to 6.4 km/sec. Both conventional powder guns and light-gas guns were used to obtain this data. Various target materials were examined including lead, steel, copper and two kinds of aluminum, 1100 F and 2014-T6. The data show that for the velocity range and materials considered, the cavity shape approaches that of a hemisphere when the impact is in the hypervelocity region. Also, the ratio of impact energy to crater volume as a function of impact velocity seems to approach a constant value in the hypervelocity region for each projectile-target system except for tungsten carbide into lead. (Author)

AD-628 000 Fld. 19/4, 20/4
CFSTI Prices: HC $4.00 MF $0.75
NAVAL ORDNANCE LAB WHITE OAK MD AIR/GROUND EXPLOSIONS DIV
PRESSURE WAVES IN THE AIR ABOVE A SHALLOW UNDERWATER EXPLOSION: AN APPROXIMATE CALCULATION BY THE METHOD OF CHARACTERISTICS,
by John F. Goertner. 28 Dec 65, 101p. Task RRRE-51001/212-8/F008-21-03
NOLTR 65-31

Unclassified report

Descriptors: (*Underwater explosions, Shock waves), Explosion effects, Airburst, Blunt bodies, Boundary value problems, Acoustics

An approximate method for calculating the pressure wave ahead of an impulsively started blunt-nosed axisymmetric body of arbitrary and variable nose radius and velocity is described. The method is then used to calculate the pressure wave ahead of the spray dome and water plume from 1-lb explosions at depths from 0.3 to 0.6 feet. Agreement with experimental data is good. The results demonstrate that taking the outer contour of the spray dome and water plume as an impervious surface displacing the air is a practicable boundary condition for air wave calculations. They also demonstrate the dominance of the plume motion in producing airblast at the shallow end of the above depth range. (Author)

AD-628 033 Fld. 19/4
CFSTI Prices: HC $2.00 MF $0.50
STANFORD RESEARCH INST MENLO PARK CALIF
AN ANALYSIS OF THE SHOCK INITIATION OF GRANULAR EXPLOSIVES BY THE GAS COMPRESSION -CONDUCTION MECHANISM,
by C. M. Ablow, Y. D. S. Rajapakse, and Marjorie W.Evans. 1 Oct 65, 30p. Rept. no. WSCI-65-30
Contract AF49 (638)-1124
AFOSR 65-2308

Descriptors: (*Detonations, Solids), Detonation waves, Compressible flow, Explosives initiators, Propellant grains, Grain boundaries, Phase studies

The role of the gas compression-conduction mechanism in shock initiation of granular materials was studied by analyzing the dependence of grain surface temperature on the magnitude of the shock and the relative sizes of grain and surrounding volume of interstitial gas. It is shown that at one atmosphere initial ambient pressure the mechanism can be a contributing factor to initiation if particle size distribution or particle irregularity leads to the existence of small particles surrounded by large, gas-filled spaces; the required sizes are possible for real materials. At low pressures (approximately 10 microns Hg) on the other hand, it is unlikely that the mechanism is a contributing factor. Since in practice these granular masses can be shock-initiated independent of initial ambient pressure, the conclusion is that at least one primary initiation mechanism other than gas compression-conduction plays a role.

AD-627 536 **See Fld. 14/2**

19/6. GUNS

AD-627 806 Fld. 19/6, 20/6
CFSTI Prices: HC $2.00 MF $0.50
SPRINGFIELD ARMORY MASS
INFRARED TEMPERATURE MAPPING OF WEAPONS.
Technical rept.,
by P. Shajenko, and C. L. Nickerson. 26 Nov 65, 40p. Rept. no. SA-TR20-2601
Proj. PA-M1-5-50018-01-M1-M6

Unclassified report

Descriptors: (*Infrared equipment, Ordnance laboratories), (*Ordnance laboratories, Infrared equipment), (*Infrared scanning, Firing tests (Ordnance)), (*Weapons, Infrared scanning), Weapon systems, Thermal radiation, Measurement, Machine guns, Non-destructive testing

An infrared scanning technique was investigated for use in temperature measurement, and in heat distribution and heat flow studies of weapons. Equipment used, calibration, emissivity measurement methods, and data evaluation procedure are described. The technique was applied to mapping temperatures of an operating M60C machine gun. Temperature data on the barrel, gas cylinder, and buffer were obtained during two tests. Ease of application, reliability and accuracy of data obtained are cited. The information obtained indicates that the infrared technique is superior to any other existing technique for mapping temperatures of weapons. (Author)

AD-628 038 Fld. 19/6
CFSTI Prices: HC $3.00 MF $0.75
SPRINGFIELD ARMORY MASS
EVALUATION OF PRETREATMENT PROCESSES AND LONG-TERM STORAGE ON MAGAZINE SPRING FOR THE M14, 7.62MM, RIFLE)
Technical rept.,
by A. H. LaRiviere. 1 Feb 66, 73p. Rept. no. SA-TR11-2643
Proj. DA-M1-4-23002

Unclassified report

Descriptors: (*Gun auxiliary equipment, Rifles), (*Storage, Gun auxiliary equipment), (*Springs, Gun auxiliary equipment), Protective treatment, Performance (Engineering), Processing, Feed mechanisms

A study was made to evaluate the effects of various pretreatment processes and long-term storage on the magazine spring for the M14, 7.62mm, rifle. The various pretreatment processes considered in the study were: (1) stress-relieving only, (2) stress-relieving and cold-set, (3) stress-relieving and heat-set, and (4) heat-set only. The storage tests involved periods from 1 to 5 years and consisted of hot, cold, and normal temperature conditions. Test procedures are described and results discussed. (Author)

AD-628 010 **See Fld. 15/5**

Field 20-PHYSICS

20/1. ACOUSTICS

AD-627 457 Fld. 20/1
CHICAGO UNIV ILL
VELOCITY OF SOUND AND LAMBDA LINES,
by D. H. Douglass,Jr.. 8 Nov 65, 3p. Contract DA-AROD-31-124-G442
AROD 4184:6

Unclassified report

Availability: Published in Physical Review Letters v15 n25 p951-3 Dec 20 1965. Copies to DDC users only.

Descriptors: (*Helium, Acoustic properties), Liquefied gases, Velocity, Phase studies, Temperature, Specific heat, Thermodynamics

Measurements of the velocity of first sound very near the lambda line of liquid helium that were made by Rudnick and Shapiro (Phys. Rev. Letters 15:386, 1965) are interpreted in terms of small departures from the thermodynamic relations of Pippard (Phil. Mag. 8:473, 1956). The Pippard relations inferred a discontinuity in the velocity of sound. Small departures from the Pippard relations are shown to have a large influence on the velocity of sound near the lambda line, and the measurements of Rudnick and Shapiro are shown possible of interpretation in terms of the small departures instead of a discontinuity of the velocity of sound. Without a velocity-of-sound discontinuity, there would be no need for the new phase for liquid helium postulated by Revzen, Ron, and Rudnick (Phys. Rev. Letters 15:384, 1965).

AD-627 482 Fld. 20/1, 20/12, 20/3
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
LINE SHAPE AND AMPLITUDE OF GIANT QUANTUM OSCILLATIONS IN ULTRASONIC ABSORPTION.
Revised ed.,
by Yaacov Shapira, and Benjamin Lax. 6 Jan 65, 9p. Contract AF49 (638)-1468
AFOSR 65-2031

Unclassified report

Revision of manuscript submitted 20 Nov 64. Prepared in cooperation with Lincoln Lab., Mass. Inst. of Tech., Cambridge.

Availability: Published in The Physical Review, v138 n4A pA1191-9 17 May 1965. Copies to DDC users only.

Descriptors: (*Ultrasonic radiation, Absorption), (*Gallium, Oscillation), Magnetic fields, Acoustic properties, Single crystals, Electrons, Phonons, Relaxation time, Quantum mechanics, Cryogenics, Atomic energy levels

The line shape of the giant quantum oscillations and the dependence of the amplitude of these oscillations of ultrasonic frequency, magnetic field, and temperature calculated on the basis of the theory of Gurevich et al. Expressions for determining cross sections of the Fermi surface, effective masses, g factors, matrix elements of the electron-pho-

non interaction, and electron relaxation times, by the use of giant quantum oscillations, are given. Measurements of the line shape and amplitude of the giant quantum oscillations in gallium are presented and compared with theory. (Author)

AD-627 565 Fld. 20/1, 5/2
CFSTI Prices: HC $3.00 MF $0.75
ARMY MATERIALS RESEARCH AGENCY WATERTOWN MASS MATERIALS TECHNOLOGY DIV
A REPORT GUIDE TO ULTRASONIC ATTENUATION LITERATURE.
Monograph series,
by Ernest H. Rodgers. Dec 65, 70p.
AMRA MS-65-09

Unclassified report

Descriptors: (*Ultrasonic radiation, Attenuation), (*Bibliographies, Ultrasonic radiation), Information retrieval, Abstracts, Indexes, Materials, Ultrasonic properties, Non-destructive testing

This compilation provides a simple and fast access to information on the subject of Ultrasonic Attenuation, and also to provide sufficient information in the form of abstracts and word descriptors to make the listing useful. (Author)

AD-627 745 Fld. 20/1, 9/2
CFSTI Prices: HC $2.00 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C ACOUSTICS AND VIBRATION LAB
A FORTRAN PROGRAM FOR CALCULATING THE SOUND RADIATION FROM A VIBRATING SURFACE OF REVOLUTION,
by George Chertock. Dec 65, 42p. Rept. no. 2083
Proj. S-R011-01-01, S-F013-11-08 Task 0401, 10441

Unclassified report

Descriptors: (*Programming (Computers), Acoustics), (*Acoustics, Programming (Computers)), (*Sound transmission, Programming (Computers)), Bodies of revolution, Vibration, Numerical analysis, Integral equations, Programming languages

A FORTRAN program is presented which computes the sound pressures, at the surface and in the near or far field, radiated by an arbitrary surface of revolution which is vibrating in an almost arbitrary pattern with arbitrary frequency and phase. The method of solution, the input data, and the output data are all described in detail. (Author)

AD-627 776 Fld. 20/1, 8/7
NATIONAL BUREAU OF STANDARDS BOULDER COLO
INFRASONIC OBSERVATIONS OF THE MAY 16, 1963, VOLCANIC EXPLOSION ON THE ISLAND OF BALI.
Revised ed.,
by V. H. Goerke, J. M. Young, and R. K. Cook. 23 Aug 65, 6p.

Unclassified report

Revision of manuscript submitted 5 Oct 64.

Availability: Published in Journal of Geophysical Research v70 n24 p6017-22 Dec 15 1965. Copies

Descriptors: (*Volcanoes, Acoustical properties), (*Acoustics, Volcanoes), Explosions, Indonesia, Sound, Propagation, Atmosphere, Geophysics

The volcanic eruption of Mount Agung on the Island of Bali reached explosive proportions on May 16, 1963. Perturbations generated in the atmosphere traveling at sonic velocities were recorded in Boulder, Colorado, 14,700 km distant, both via the short great-circle path and via the long great-circle path through the antipodes and around the world. In Boston, Massachusetts, 16,200 km distant, and in Washington, D. C., 16,300 km distant, sound waves were received via the short great-circle path. The average transit velocity for the short path was 17 m/sec less than for the long path. The effect of wind velocities at mesospheric heights on the transit velocities is discussed. (Author)

AD-627 783 Fld. 20/1, 20/13
HARVARD UNIV CAMBRIDGE MASS
THEORY OF ULTRASONIC ATTENUATION AND SECOND SOUND IN INSULATORS,
by P. C. Kwok, P. C. Martin, and O. B. Miller. 3 May 65, 4p. Contract AF49 (638)-1380
AFOSR 65-2790

Unclassified report

Prepared in cooperation with IBM Watson Research Lab., Yorktown Heights, N. Y.

Availability: Published in Solid State Communications, v3 n8 p181-4 1965. Copies to DDC users only.

Descriptors: (*Ultrasonic radiation, Attenuation), (*Phonons, Thermal radiation), (*Thermal radiation, Superfluidity), Cryogenics, Helium, Crystals, Damping

The properties of interacting phonons are determined in a unified fashion through a study of the displacement correlation function. Expressions for the attenuation are obtained at all frequencies and for different anharmonic mechanisms in insulators and helium. Second sound is shown to be an additional phonon mode at long wavelength. (Author)

AD-627 897 Fld. 20/1
CFSTI Prices: HC $1.00 MF $0.50
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
AERODYNAMICALLY GENERATED SOUND.
Final scientific rept.,
by H. S. Ribner. Dec 65, 16p. Contract AF-AFOSR-672-64 Proj. AF-9781 Task 978102
AFOSR 65-2714

Unclassified report

Descriptors: (*Airplane noise, Bibliographies), (*Acoustics, Airplane noise), Jet engine noise, Aerodynamics

Contents: Response of a flexible panel to turbulent flow: running wave versus modal density analysis; Turbulence measurements relevant to jet noise; An aerofoil probe for measuring transverse velocity in unsteady flow; Refraction of sound by jet flow and jet temperature; Distortion of a shock wave traversed by a vortex; and Survey article on jet noise.

AD-627 957 Fld. 20/1
ROCHESTER UNIV N Y
ON THE BESSEL-FUBINI AND FAY SOLUTIONS FOR PLANE, FINITE-AMPLITUDE WAVES,
by David T. Blackstock. 1965, 4p. Contract AF49 (638)-1320
AFOSR 65-2481

Unclassified report

Availability: Published in Congres-International D'Acoustique (5th) Liege 7-14 Sep 1965 p1-4. Copies to DDC users only.

Descriptors: (*Sound, Mathematical analysis), Approximation (Mathematics), Harmonic analysis, Shock waves

AD-627 964 Fld. 20/1, 20/4
CFSTI Prices: HC $2.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
PROPAGATION OF SOUND IN A REACTING GAS MIXTURE NEAR EQUILIBRIUM,
by Joseph J. Roseman, and Vito D. Agosta. 1965, 33p. Rept. no. PIBAL-796
Contract AF-AFOSR-86-63
AFOSR 65-2307

Unclassified report

Papers presented at the Conference on Performance of High Temperature Systems (3rd), Pasadena, Calif., 7-9 Dec 64.

Descriptors: (*Sound, Propagation), (*Gas flow, Acoustic properties), Reaction kinetics, One-dimensional flow, Velocity, Mixtures, Differential equations, Chemical equilibrium, Thermodynamics

The one-dimensional propagation of sound and the significance of the two sound speeds (frozen and equilibrium) is examined in detail for the case of a gas mixture at or near equilibrium, consisting of gases which obey the ideal gas law and Dalton's law of partial pressures and which have all their degrees of freedom fully excited.

AD-627 320 See Fld. 17/2

AD-627 328 See Fld. 20/4

AD-627 383 See Fld. 17/1

AD-627 441 See Fld. 21/2

AD-627 524 See Fld. 15/1

AD-627 657 See Fld. 20/11

AD-628 020 See Fld. 20/5

20/2. CRYSTALLOGRAPHY

AD-627 342 Fld. 20/2
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA PA
QUANTITATIVE TEXTURE MEASUREMENTS ON EVAPORATED FILMS,
by Fred Witt, Richard W. Vook, and Milton E. Schwartz. 29 Jun 65, 8p. Contract AT (30-1)-3347 Proj. DA-1C014501B32A
FA A65-10

Unclassified report

Prepared in cooperation with Franklin Research Labs., Philadelphia, Pa.

Availability: Published in Journal of Applied Physics, v36 n11 p3686-7 Nov 1965. Copies to DDC users only.

Descriptors: (*Films, Symmetry (Crystallography)), (*Symmetry (Crystallography), Gold), Vapor plating, Substrates, Corrections, X-ray diffraction analysis

A method is described for determining pole figures from thin films which are still attached to their substrates. The usual correction formulas take into account absorption and change in diffracting volume as the thin film rotates in the X-ray beam. Additional correction formulas are derived which take into account the X-ray scattering from and attenuation in the substrate. The technique is demonstrated for a highly oriented 885 A gold film deposited on a thin optical glass substrate. (Author)

AD-627 406 Fld. 20/2, 7/2, 20/12
CFSTI Prices: HC $1.00 MF $0.50
PENNSYLVANIA STATE UNIV UNIVERSITY PARK MATERIALS RESEARCH LAB
CRYSTAL CHEMISTRY STUDIES.
Quarterly rept. no. 1, 13 May-13 Aug 65,
by Rustum Roy, S. Kachi, G. J. McCarthy, O. Muller, and W. B. White. 24 Aug 65, 18p. Contract DA-28-043-AMC-01304 (E) Proj. DA-1C0-14501-B13A

Unclassified report

See also AD-266 618.

Descriptors: (*Crystals, Solid state physics), (*Solid state physics, Crystals), Oxides, Transition elements, Rare earth compounds, Rhenium compounds, Crystal structure, Phase studies, Vanadium compounds, Samarium compounds, Europium compounds, Glass, Ions, Cobalt, Nickel, Chromium, Oxidation-reduction reactions, Electron transitions, Magnesium compounds, Cadmium compounds, Nickel compounds

Research has been concerned with (1) the systematic study of the rare earth - rhenium oxide systems in a search for new ferrimagnetic compounds. Several ternary phase areas have been determined and work on the crystal structure and composition of these phases is in progress; (2) Six intermediate phases have been isolated in the system V2O3-V2O5. Four of these phases have magnetic and electrical phase transitions; (3) Work has been started with the Sm-O system. SmO has been prepared by hydrogen reduction of Sm2O3. (4) The site preference (tetrahedral, octahedral) of Co and Ni ions in glass has been redetermined. While the Ni (2+)/Ni (3+) ratio increases with oxygen pressure, no measurable changes in the Cr (2+)/Cr (3+) ratio have been found. (Author)

AD-627 458 Fld. 20/2
DALHOUSIE UNIV HALIFAX (NOVA SCOTIA)
DETERMINATION OF THE CRYSTAL STRUCTURE OF ERBIUM TITANATE, ER2TI207, BY X-RAY AND NEUTRON DIFFRACTION,
by Osvald Knop, Francois Brisse, and Lotte Castelliz. 21 Apr 65, 16p. Contract DRB-800107/200024

Unclassified report

Availability: Published in Canadian Journal of Chemistry v43 p2812-26 1965. Copies to DDC users only.

Descriptors: (*Crystal structure, Erbium compounds), (*Titanates, Crystal structure), (*Erbium compounds, Titanates), Canada, X-ray diffraction analysis, Neutron diffraction analysis, Least squares method, Spectra (Infrared)

The crystal structure of erbium titanate, Er2Ti2O7, has been shown by X-ray and neutron powder diffraction to be of the cubic pyrochlore type, with a sub = 10.0762 plus or minus 6A. Least-squares isotropic refinement based on resolved single reflections gave x O sub 2 = 0.4200 plus or minus 10 and R = 2.25%. Ionic and neutral X-ray scattering factors gave practically identical results. The six equal Ti--O sub 2 distances in the distorted coordination octahedron of the Ti atom are 1.955 plus or minus 5A. The two short (apparent) Er--O distances are 2.1815 plus or minus 5A (Er--O sub 1) and 2.471 plus or minus 8A (Er--O sub 2). The infrared spectrum of the titanate in the region 1 600 to 250 cm shows features similar to those encountered in the spectra of other simple oxygen compounds of titanium. (Author)

AD-627 468 Fld. 20/2, 7/2, 20/10
CFSTI Prices: HC $2.00 MF $0.50
PENNSYLVANIA STATE UNIV UNIVERSITY PARK MATERIALS RESEARCH LAB
CRYSTAL CHEMISTRY STUDIES.
Quarterly rept. no. 2, 13 Aug-13 Nov 65,
by Rustum Roy, S. Kachi, G. J. McCarthy, O. Muller, and W. B. White. Jan 66, 34p. Contract DA-28-043-AMC-01304 (E) Proj. DA-1C0-14501-B13A

Unclassified report

Includes Phase Equilibrium Studies and Transitions in the System V2O3-V2O5, TR-1. See also AD-266 618.

Descriptors: (*Crystals, Solid state physics), (*Solid state physics, Crystals), Oxides, Transition elements, Rare earth compounds, Rhenium compounds, Crystal structure, Phase studies, Vanadium compounds, Samarium compounds, Europium compounds

Research has been concerned with (1) the study of the crystal chemistry of a series of rare earth-rhenium oxide compounds. Six new phases have been found and identified by x-ray and electron probe analysis; (2) Study of the binary system V-O has been completed and described in a Technical Report 'Phase Equilibrium Studies and Transitions in the System V2O3-V2O5.' Five out of seven intermediate stable phases found behave like antiferromagnetic materials, having different Neel points; (3) Work has continued to synthesize SmO and EuO. Methods such as reduction of the sesquioxides, oxidation of the metals and reaction of the metal with the sesquioxides have been tried. So far, SmO has been prepared successfully only by the latter method. (Author)

AD-627 512 Fld. 20/2, 7/3
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
THE CRYSTAL AND MOLECULAR STRUCTURE OF /3.3/-PARACYCLOPHANE,
by Peter K. Gantzel, and K. N. Trueblood. 24 Sep 64, 11p. Contract AF49 (638)-719
AFOSR 65-2160

Unclassified report

Availability: Published in Acta Crystallographica, v18 pt5 p958-68 Mar 1965. Copies to DDC users only.

Descriptors: (*Polycyclic compounds, Crystal structure), (*Crystal structure, Polycyclic compounds), (*Molecular structure, Polycyclic compounds), Crystal lattices, Least squares method, Chemical bonds, Molecular properties, Stereochemistry

/3.3/Paracyclophane (C18H20) forms monoclinic crystals with a = 9.715, b = 8.138, c = 8.524 A, beta = 90.69 degrees, and two molecules in the unit cell in space group P2 (1)/n. The structure was refined by full-matrix least-squares methods, and the final parameters include small corrections for molecular libration. The aromatic rings are deformed slightly into a symmetrical boat form, the bending being about 6 degrees at each end; the alpha-carbons are bent further, by an average of nearly 4 degrees. The two rings do not lie directly above one another, being displaced about 0.5 A from such an arrangement. The bond angles in the side chain are slightly larger than the normal values, and the dihedral angles are also slightly greater than those in n-butane. All bond distances are consistent with those found in other hydrocarbons. There are no short non-bonded intermolecular contacts, and the shortest intramolecular ones are only slightly less than the sum of the van der Waals radii, and thus are consistent with the comparatively small observed distortion of the molecule. (Author)

AD-627 513 Fld. 20/2, 7/3
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
THE CRYSTAL STRUCTURE OF THE DIOLEFIN OF/2.2/-PARACYCLOPHANE,
by C. L. Coulter, and K. N. Trueblood. 17 Jun 62, 10p. Contract AF 49 (638)-719
AFOSR 65-2161

Unclassified report

Availability: Published in Acta Crystallographica, v16 pt7 p667-76 Jul 1963. Copies to DDC users only.

Descriptors: (*Polycyclic compounds, Crystal structure), (*Dienes, Crystal structure), (*Crystal structure, Polycyclic compounds), Crystal lattices, Least squares method, Stereochemistry, Aromatic compounds, Chemical bonds, Strain (Mechanics), Molecular structure, Molecular orbitals

The diolefin of /2.2/paracyclophane (C16H12) forms monoclinic crystals with a = 6.866, b = 11.636, c = 7.640 A, beta = 116.9 degrees, and two molecules in the unit cell in space group P2 (1)/c. The structure was refined by full matrix three-dimensional least-squares methods, and the final parameters include small corrections for molecular libration. The aromatic rings are bent into a boat form about 14 degrees at each end, and the bonds to the alpha-carbons are bent an additional 15 degrees from the plane of the edge of each aromatic ring. The ring deformation may also be described as a folding of 16 degrees about a line between the p-substituted atoms. The exocyclic single bond distance is 15.1 A, at least 0.02 A longer than normal. The lengthening is attributed in part to the orthogonality of the pi -systems in the molecular and in part to intramolecular strain. Other distances are normal. The distribution of strain in the molecule is discussed. (Author)

AD-627 526 Fld. 20/2
MELPAR INC FALLS CHURCH VA
GROWTH OF SINGLE CRYSTALS AND BICRYSTALS OF ALKALI HALIDES,
by N. Fuschillo, C. E. Nelson, and M. L. Gimpl. 26 Apr 65, 5p. Contract DA-31-124-ARO (D)-377
AROD 5727:1

Unclassified report

Availability: Published in The Review of Scientific Instruments v36 n9 p1341-4 Sept 1965. Copies to DDC users only.

Descriptors: (*Crystal growth, Alkali metal compounds), (*Alkali metal compounds, Crystal growth), (*Single crystals, Alkali metal compounds), Grain boundaries, Sodium compounds, Chlorides, Potassium compounds, Lithium compounds, Fluorides, Cesium compounds, Bromides

Techniques are described for the growth of large (6.3 sq cm by 15 cm) single crystals and bicrystals of NaCl. Grain boundaries from 2 to 45 degrees mismatch across the interface were grown for pure tilt and pure twist misorientation in NaCl by the Czochralski technique. The method of crystal growth and the techniques required for good control of the misorientation and planarity of the grain boundary are described. Similar techniques can be applied to KCl, LiF, and CsBr. The tilt grain boundaries of the NaCl bicrystals were found to be strong mechanically and not easily cleaved apart. The twist grain boundaries were very weak mechanically, especially at mismatch angles greater than 20 degrees. Techniques and results for growing long thin single crystals of NaCl which have great flexibility and for observing the substructure of the growing interface of a single crystal are described. (Author)

AD-627 582 Fld. 20/2
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
GROWTH OF LARGE SINGLE CRYSTALS OF HEXAGONAL SELENIUM FROM THE MELT AT HIGH PRESSURE,
by D. E. Harrison, and W. A. Tiller. 2 Oct 64, 6p. Contract AF49 (638)-1029 Proj. AF-9761 Task 976102
AFOSR 65-2033

Unclassified report

Availability: Published in Journal of Applied Physics, v36 n5 p1680-3 May 1965. Copies to DDC users only.

Descriptors: (*Selenium, Single crystals), (*Crystal growth, Selenium), High-pressure research

The preparation of single crystals of hexagonal selenium at ordinary pressures is hampered by the very slow rate at which crystals can be grown from the melt under these conditions. In this paper a technique is presented for preparing single crystals under pressure. As the equilibrium freezing temperature is increased by the application of pressure, crystals can be grown at rates several orders of magnitude faster than under ordinary pressures.

At 5 kbar pressure, single crystals were grown up to 1 cm in diam by 10 cm long. X-ray and optical studies established the principal cleavage surfaces. (Author)

AD-627 638 Fld. 20/2
CFSTI Prices: HC $3.00 MF $0.75
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND APPLIED PHYSICS
CALCULATIONS OF THE VIBRATIONAL SPECTRA OF DISORDERED SYSTEMS. I. VIBRATIONAL SPECTRUM OF A ONE-DIMENSIONAL CHAIN WITH RANDOMLY DISTRIBUTED IMPURITY SPRINGS. II. THE ELASTIC SPECTRA OF TWO-DIMENSIONAL DISORDERED LATTICES.
Technical rept.,
by Hin-Chiu Poon, and Arthur Bienenstock. Dec 65, 64p. Contract SD-88
ARPA 18
Unclassified report

Descriptors: (*Crystal lattices, Vibration), (*Vibration, Crystal lattice defects), Impurities, Elasticity, Perturbation theory, Approximation (Mathematics)

The frequency spectrum of a one-dimensional lattice containing randomly distributed impurity springs was evaluated to first order in the concentration, q, of impurity springs. It is shown that, with some mathematical manipulation, the solution can be placed into correspondence with the solution of Langer for the analogous problem of isotopic impurities. The elastic vibrational spectra of perturbed square lattice systems with nearest-neighbor central and noncentral interactions were derived. The unperturbed system consists of masses, m, on the lattice points and interacting with force constants, alpha, which determines the resistance to compression, and beta, which determines the resistance to shear along the direction (10). In one case, the perturbations are Nq randomly positioned isotopic impurities of mass m', where N is the number of lattice sites. It is shown that the elastic spectrum for this, and all other isotopic impurity systems, is completely determined by the average mass, (1 - q)m + qm'.

AD-627 711 Fld. 20/2, 20/11
CFSTI Prices: HC $2.00 MF $0.50
LOWELL TECHNOLOGICAL INST RESEARCH FOUNDATION MASS
EFFECTS OF EXTERNAL FORCES (TRANSIENT AND PERMANENT).
Quarterly rept. no. 2, 1 Aug-31 Oct 65,
by Charles R. Mingins, Robert W. Perry, and Luther C. Barcus. 31 Oct 65, 47p. Rept. no. 18
Contract DA-28-043-AMC-01240 (E) Proj. 1P6-22001-A-058 Task 1P6-22001-A-058-01-04
Unclassified report

See also AD-621 739.

Descriptors: (*Piezoelectric crystals, Force (Mechanics)), Shear stresses, Oscillation, Stresses, Sensitivity, Rectangular bodies, Frequency shift, Theory, Curve fitting

In further research on the reactions of an excited piezoelectric crystal plate to the application of external forces and torques, a more extended study has been made of superimposed force fields set up in AT-cut piezoids. New instances here reported upon with respect to both single and superimposed force arrangements include (a) rectangular plates with edges rotated in the XZ' plane, (b) larger plates than those previously used, and (c) combinations of tensile and compressive forces applied simultaneously. Results obtained with shearing stresses, some of them quite large, in rectangular and circular plates are reported. Experiments carried out in the application of transient forces to oscillating crystals are discussed. Nonlinear theory is applied to the complete range of X-rotated cuts and the results are assayed by the degree of fit between experimental and theoretical curves. (Author)

AD-627 729 Fld. 20/2
CALIFORNIA UNIV BERKELEY DEPT OF PHYSICS
INTENSITY ,CORRELATIONS IN RAMAN SCATTERING,
by Alexander L. Fetter. 5 Apr 65, 8p. Contract AF-AFOSR-130-65 Proj. AF-9767 Task 976701
AFOSR 65-2046
Unclassified report

Availability: Published in The Physical Review, v139 n5A pA1616-23 30 Aug 1965. Copies to DDC users only.

Descriptors: (*Raman spectroscopy, Crystal lattices), (*Crystal lattices, Vibration), Phonons, Lasers, Light, Scattering, Intensity, Crystal structure

Correlated counting rates in Raman scattering are proposed as a means of studying optical phonons in crystals. This technique may be used to measure both the lifetime and spatial coherence of the vibrational states. Experimental counting times are estimated to be the order of 50 micro sec for the case of a gas laser as a light source. (Author)

AD-627 749 Fld. 20/2, 20/3, 20/12
ILLINOIS UNIV URBANA DEPT OF CERAMIC ENGINEERING
DEFECT STRUCTURES FERROELECTRICS. HIGH -TEMPERATURE PHASE TRANSITIONS IN NANB03. A STUDY OF THE PHASE TRANSITIONS IN PBZR03,
by Victor J. Tennery. 7 Feb 66, 8p. Rept. no. TR-2
Contract Nonr-1834 (38) Proj. NR-032-467
Unclassified report

Availability: Published in Journal of the American Ceramic Society v48 n10 p537-9 Oct 1965, and Journal of Electrochemical Society v112 n11 p1117-20 Nov 1965. Copies to DDC users only.

Descriptors: (*Ferroelectric materials, Phase studies), (*Sodium compounds, Niobates), (*Lead compounds, Zirconates), X-ray diffraction analysis, Symmetry (Crystallography), High-temperature research, Impurities, Thermal expansion, Hysteresis, Ferroelectricity, Ferroelectric crystals

An X-ray diffraction study of a high-purity NaNbO3 specimen in the range 25 to 705C is reported. Phase transitions occurred at 372, 420, 478, 527, 576, and 640 plus or minus 5C. The symmetry of the perovskite subcell changed from monoclinic to tetragonal at 372C when heated and remained tetragonal up to 640C when it became cubic. Two-phase mixtures were observed at 372, 576, and 640C and it was concluded that these transitions are probably of first order. An investigation of the linear thermal expansion of high purity specimens of polycrystalline PbZrO3 has revealed that a ferroelectric phase is stable in this compound between 226 and 236C on heating. The same phase exists between 226 and 212C on cooling. The data were all obtained at a constant heating and cooling rate of 1C/min. The thermal expansion of high purity specimens containing about 200 ppm more calcium than those exhibiting the ferroelectric phase did not indicate the existence of such a phase.

AD-627 775 Fld. 20/2, 20/3
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
NONLINEAR AND LINEAR SHIELDING OF RAREEARTH CRYSTAL-FIELD INTERACTIONS,
by A. J. Freeman, and R. E. Watson. 1 Apr 65, 12p. Contract AF49 (638)-1468 Proj. AF-9764
AFOSR 62-2000
Unclassified report

Availability: Published in The Physical Review v139 n5A pA1606-15 Aug 30 1965. Copies to DDC users only.

Descriptors: (*Crystals, Field theory), (*Electrostatic fields, Crystals), (*Rare earth elements, Ions), Atomic energy levels, Valence, Matrix algebra, Cerium, Terbium, Ytterbium

It was shown previously that significant nonlinear shielding of the rare-earth electrostatic crystalline-field interactions may occur, and hence that the standard parametrization scheme used to determine the crystalfield parameters was questionable. These nonlinear effects arise from the same distortions of the closed shells in rare-earth ions which produce the (larger) linear shielding of the crystal field V. Both nonlinear and linear shielding effects have been investigated for the rare-earth ions Ce (3+), and Tb (3+) through Yb (3+) inclusive. The method of single substituted configurations is employed and is shown to avoid the difficulties associated with the traditional single-determinant perturbationtheory approach previously used exclusively by various authors. Results based on both methods are given and compared; significant differences in linear-sheilding predictions are found to be introduced by the inexact traditional approach. Calculations for the nonlinear 5p to 4f effects have been done, and results displayed, as a function of the strength of V (based on the point-charge model). The relevance of these effects to experiment is examined qualitatively. (Author)

AD-627 955 Fld. 20/2, 7/3
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
THE CRYSTAL AND MOLECULAR STRUCTURE OF 1,1'-TETRAMETHYLETHYLENEFERROCENE,
by Mary Burke Laing, and K. N. Trueblood. 5 Aug 64, 11p. Contract AF49 (638)-719 Proj. AF-9762 Task 976201
AFOSR 65-2387
Unclassified report

Availability: Published in Acta Crystallographica v19 pt3 p373-81 Sep 1965. Copies to DDC users only.

Descriptors: (*Ferrocenes, Crystal structure), (*Crystal structure, Ferrocenes), (*Molecular structure, Ferrocenes), Crystal lattices, Fourier analysis, Least squares method, Chemical bonds, Stereochemistry

1,1'-Tetramethylethyleneferrocene forms monoclinic plates of space group P21/c, and four molecules in the unit cell with a = 7.756, b = 10.97, c = 15.41, and beta = 92.63 degrees. The structure was solved from three-dimensional Patterson and Fourier syntheses, and was refined by block-diagonal least squares. The two five-membered rings are tilted 23 degrees with respect to one another, but because of the bridge linking them are staggered only by about 9 degrees, in contrast to ferrocene. The strain in the molecule is apparent also in the fact that the dihedral angles in the bridge are only about 26 degrees, and that the exocyclic bonds are bent about 11 degrees from the ring planes. The bond distances in the bridge are slightly greater than normal. The bond distances in the ring and to the iron atom appear normal. (Author)

AD-627 381 See Fld. 20/12

AD-627 470 See Fld. 20/12

AD-627 620 See Fld. 20/3

AD-627 622 See Fld. 20/12

AD-627 764 See Fld. 7/4

AD-627 811 See Fld. 20/11

AD-627 848 See Fld. 14/2

AD-627 938 See Fld. 7/2

AD-627 973 See Fld. 20/13

AD-628 022 See Fld. 13/8

AD-628 025 See Fld. 9/3

20/3. ELECTRICITY AND MAGNETISM

AD-627 431 Fld. 20/3, 9/5, 9/2, 22/1, +
CFSTI Prices: HC $3.00 MF $0.75
AEROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D C
FOREIGN SCIENCE BULLETIN, VOLUME 2, NUMBER 1, 1966.
Jan 66, 91p.
TT 66-60444

Unclassified report

AMonthly Review of Selected Foreign Scientific and Technical Literature sponsored by the Department of Defense.

Descriptors: (*Scientific research, Reviews), Photoconductivity, Films, Voltage, Waveguides, Polarization, Energy conversion, Computer logic, Microminiaturization (Electronics), Moon, Surface properties, Lunar surface vehicles, Cosmic rays, Rocket motors, USSR

Contents: The case of the illegitimate voltage; TE to TM mode conversion; Homogeneous microelectronic structures for computer circuitry; The lunar surface; Investigation of high- and ultra-high-energy primary cosmic rays by means of the proton 1 and 2 scientific space stations; Deficiencies in soviet research in optics and spectroscopy; Electron motion in the double-row nigotron; Rocket Engine Design Bureau.

AD-627 459 Fld. 20/3
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
MOSSBAUER STUDIES OF SPIN FLOP IN ANTIFERROMAGNETIC HEMATITE,
by N. Blum, A. J. Freeman, and J. W. Shaner.
1965, 4p. Contract AF498 (638)-1468
AFOSR 65-1990

Unclassified report

Availability: Published in Journal of Applied Physics v36 n3 pt2 p1169-70 Mar 1965. Copies to DDC users only.

Descriptors: (*Iron compounds, Oxides), (*Antiferromagnetism, Iron compounds), (*Mossbauer effect, Antiferromagnetism), Magnetic properties, Hyperfine structure, Magnetic fields

The antiferromagnetic sublattice magnetizations below the Morin transition temperature 260K, are parallel and antiparallel to the trigonal axis of rhombohedral alpha-Fe2O3. Experiments at 80K, using the Mossbauer technique together with high external magnetic fields on both polycrystalline and single-crystal samples, show that the directions of the sublattice magnetizations flop from along the trigonal axis for the applied field H sub o < H sub c to perpendicular to the trigonal axis for H sub o > H sub c; is found to be 67.5 plus or minus 3 kOe. In the polycrystalline sample this behavior is exhibited through the occurrence of a maximum in the width of the outer lines of the Mossbauer spectrum plotted as a function of H sub c. In the single crystal, which is oriented so that the gamma rays propagate along the (111) direction, the magnetic transition is clearly observed as a sudden qualitative as well as quantitative change in the appearance of the Mossbauer hyperfine spectrum; below the critical field the delta m = 0 lines are the strongest components of the six-line spectrum. (Author)

AD-627 561 Fld. 20/3, 20/12
NORTHWESTERN UNIV EVANSTON ILL DEPT OF ELECTRICAL ENGINEERING
CLOSED FORM EXPRESSION FOR THE MIE SERIES FOR LARGE, LOW DENSITY, DIELECTRIC SPHERES,
by M. A. Plonus, and H. Inada. 14 Apr 65, 4p.
Contract AF49 (638)-1377 Proj. AF-9749 Task 974901
AFOSR 65-2340

Unclassified report

Availability: Published in Proceedings of the IEEE, p662-3 Jun 1965. Copies to DDC users only.

Descriptors: (*Dielectrics, Spheres), Backscattering, Series, Dielectric properties, Radar transmission

AD-627 617 Fld. 20/3, 20/13
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
NONLINEAR TWO-FLUID EQUATIONS FOR A SUPERCONDUCTOR,
by R. Meservey. 12 Jul 65, 4p. Contract AF49 (638)-1468 Proj. AF-9764
AFOSR 65-2022

Unclassified report

Availability: Published in Physical Review Letters, v15 n6 p248-9 9 Aug 1965. Copies to DDC users only.

Descriptors: (*Superconductors, Superfluidity), (*Electrons, Equations of motion), Calculus of variations, Superconductivity

The phenomenological equations of motion obtained from Eckart's variational principle (Phys. Rev., v. 54: 920, 1938 and Phys. Fluids, v. 3: 421, 1961) are given as applied to the 2-fluid model of a superconductor. The resulting equations yield a source term for the normal electrons and the explicit form of the osmotic-pressure term suggested by London (Superfluids, v. 1: 59, 1950). (Author)

AD-627 618 Fld. 20/3, 7/3, 20/12
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
OBSERVATION OF A FAR INFRARED RESONANCE LINE IN ANTIFERROMAGNETIC COO,
by R. C. Milward. 12 May 65, 2p. Contract AF49 (638)-1468
AFOSR 65-2021

Unclassified report

Availability: Published in Physics Letters, v16 n3 p244-5 1 Jun 1965. Copies to DDC users only.

Descriptors: (*Cobalt compounds, Monoxides), (*Antiferromagnetism, Cobalt compounds), (*Infrared spectroscopy, Cobalt compounds), Magnetic resonance, Line spectrum, Absorption spectrum, Single crystals

Far infrared transmission was studied along a 100 direction in a high purity CoO single crystal (>99.6% CoO starting material). The spectral range 10 to 250/cm was covered with a resolution of above 0.5/cm. It was found that CoO is very opaque at room temperature, but becomes fairly transparent at liquid helium temperatures. At all temperatures, the absorption appears to show an increase with frequency from the lowest frequencies, reaching a broad maximum between 150 and 200/cm with two humps centered at about 167 and 188/cm. A broad shallow peak just observable at approx. 140/cm at liquid nitrogen temperature becomes much narrower at liquid helium temperatures and shifts to slightly higher frequency. Application of moderate magnetic fields did not show any measurable broadening or splitting of the peak, but at 42 kG a satellite peak was just observable, displaced about 4/cm to higher frequency. The observed behaviour of this resonance in an external magnetic field does not conform with the usual behaviour of an antiferromagnetic resonance. No explicit theory for the external magnetic field effect has yet been formulated with which to compare these findings. (Extracted)

AD-627 620 Fld. 20/3, 20/2
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
MAGNETIC ANISOTROPY IN ANTIFERROMAGNETIC CORUNDUM-TYPE SESQUIOXIDES,
by J. O. Artman, J. C. Murphy, and S. Foner. 14 Sep 64, 6p. Contract AF49 (638)-1468 ,NOw-62-0604-c Proj. AF-9764
AFOSR 65-2025

Unclassified report

Availability: Published in The Physical Review v138 n3A pA912-7 May 3 1965. Copies to DDC users only.

Descriptors: (*Magnetic properties, Oxides), (*Anisotropy, Magnetic properties), (*Antiferromagnetism, Oxides), Metallic crystals, Chromium compounds, Iron compounds, Titanium compounds, Vanadium compounds, Crystal lattices, Paramagnetic resonance

Evaluation of the magnetic dipolar anisotropy K are made for the antiferromagnetic Cr, Fe, Ti, and V sesquioxides isomorphous to alpha-Al2O3. In the first two systems the fine structure anisotropy F is found by subtracting K from the total anisotropy obtained from antiferromagnetic resonance (AFMR) data. In Shull magnetic configuration type (c), of which Cr2O3 is the prototype, K was found to be very sensitive to lattice geometry. Owing to the use of inappropriate crystal data, a previous Cr2O3 K calculation is shown to be in serious error. The Cr2O3 AFMR results are reinterpreted accordingly. An analysis is also made for alpha -Fe2O3 Shull case (a) for which some AFMR data have recently become available. The alphs-Fe2O3 spin flip near 250 K is predictable on a thermodynamic basis. The F results in the Cr and Fe cases show little correlation with the corresponding quantities derived from EPR in diluted magnetic systems. The results of variation of lattice parameters are given for possible application to temperature and stress experiments and to diluted crystals. Since the antiferromagnetic properties of the Ti and V oxides currently are not clear, we present the appropriate K calculations for each of the three possible spin configurations. (Author)

AD-627 628 Fld. 20/3
CATHOLIC UNIV OF AMERICA WASHINGTON D C DEPT OF PHYSICS
APPLICATION OF THE METHOD OF QUASIPARTICLES TO THE HEISENBERG FERROMAGNET,
by Tohru Morita, and Tomoyasu Tanaka. 8 Jan 65, 8p. Contract AF-AFOSR-445-63 Proj. AF-9767 Task 976701
AFOSR 65-2781

Unclassified report

Availability: Published in The Physical Review v138 n5A pA1403-9 May 31 1965. Copies to DDC users only.

Descriptors: (*Ferromagnetism, Statistical mechanics), (*N-body problem, Ferromagnetism), Series, Crystal lattices, Integrals, Hamiltonian

In recent articles by the present authors, the virial expansion formula was generalized to an assembly of quasiparticles, and the result was applied to a general discussion of the effect of the n-spin-wave interaction on the low-temperature spontaneous magnetization of the Heisenberg ferromagnet. The method, which may be called the method of quasiparticles, seems to give the simplest way of calculating the low-temperature expansion of the spontaneous magnetization. In this paper, (i) the Dyson T to the 4th power term for the Heisenberg

ferromagnet is rederived by this method, and (ii) the corresponding expression for the Heisenberg ferromagnet with three exchange integrals is derived, for cubic lattices. The result is used to calculate the T to the 4th power term in the spontaneous magnetization for the Heisenberg ferromagnet with first- and secondnearest-neighbor exchanges. This suggests a method of calculating the T to the 5th power and T to the 6th power terms in the expansion for these cases and the T to the 4th power term for the Heisenberg ferromagnet with a longer range exchange interaction. (Author)

AD-627 713 Fld. 20/3, 20/14
CFSTI Prices: HC $2.00 MF $0.50
HUGHES RESEARCH LABS MALIBU CALIF
ON THE ASYMPTOTIC BEHAVIOR OF ELECTROMAGNETIC FIELDS SCATTERED FROM CONVEX CYLINDERS NEAR GRAZING INCIDENCE.
Scientifi rept.,
by W. P. Brown,Jr.. 1966, 49p. Contract AF49 (638)-1439 Proj. AF-9768
AFOSR 65-2104

Unclassified report

Descriptors: (*Electromagnetic fields, Scattering), (*Asymptotic series, Field theory), Diffraction, Boundary layer, Theory, Cylindrical bodies, Convex bodies

The work reported in this paper concerns the determination of an asymptotic expansion of the electromagnetic field scattered from a convex cylinder near grazing incidence. A systematic procedure for the generation of such an expansion is formulated from the concepts of boundary layer theory. The general form of the mth term in the expansion is derived for all points with a domain that includes the immediate vicinity of the point of grazing incidence and the penumbral region in the neighborhood of the shadow boundary. Boundary and matching conditions for the determination of the unspecified coefficients in the expansion are formulated. Finally, explicit representation for the initial term in the expansion are given for all points within the transitional domain. (Author)

AD-627 724 Fld. 20/3, 20/10, 9/3
ILLINOIS UNIV URBANA DEPT OF ELECTRICAL ENGINEERING
HARMONIC GENERATION IN HCN BY MULTIPLE QUANTUM CONVERSION,
by D. P. Akitt, and P. D. Coleman. 26 Oct 64, 8p. Contract AF-AFOSR-272-65 Proj. AF-9767 Task 976702
AFOSR 65-2058

Unclassified report

Availability: Published in Journal of Applied Physics, v36 n6 p2004-10 Jun 1965. Copies to DDC users only.

Descriptors: (*Microwave generators, Quantum mechanics), (*Hydrogen compounds, Cyanides), (*Cyanides, Harmonic generators), (*Harmonic generators, Submillimeter waves), (*Submillimeter waves, Harmonic generators), Photons, Electromagnetic waves, Waveguides, Power, Polarization, Partial differential equations

A nonlinear, quantum-mechanics experiment in third-harmonic generation by a traveling wave, multiple photon interaction in HCN gas is presented. The J = 0, J = 1 rotational levels of HCN are used to multiply from 34.7 to 104 Gc/sec with a peak power output at 104 Gc/sec in excess of 1.5 W. The interaction takes place in a length of RG 96/U waveguide. Harmonic power output is plotted against fundamental power input for interaction lenghts varying from 0.5 to 3.0 m in 0.5-m steps and gas pressures from 250 to 450 Torr. These data are compared with a theoretical analysis. (Author)

AD-627 777 Fld. 20/3, 14/2
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
LOW FREQUENCY FIELD MODULATION DIFFERENTIAL MAGNETOMETER; APPLICATIONS TO THE DE HAAS-VAN ALPHEN EFFECT,
by A. Goldstein, S. J. Williamson, and S. Foner. 25 Jan 65, 10p. Contract AF49 (638)-1468
AFOSR 65-2559

Unclassified report

Availability: Published in The Review of Scientific Instruments v36 n9 p1356-65 Sep 1965. Copies to DDC users only.

Descriptors: (*Magnetometers, Low frequency), (*Magnetic properties, Measurement), Magnetic moments, Magnetic fields, Harmonic analysis, Modulation, Atomic energy levels

Low frequency field modulation techniques (FMT) for measurements of differential magnetic susceptibility are discussed and specific applications to the de Haas-van Alphen effect are analyzed. The method utilizes a small ac modulating field which superimposed on a large applied dc magnetic field. Differential changes in magnetization of the sample are synchronously detected with the aid of a suitable arrangement of pickup coils. The FMT is applicable to a wide variety of magnetic measurements and is particularly valuable for de Haasvan Alphen or magnetic transition studies at high magnetic fields. Advantages of this technique include: simplicity, versatility, direct applicability to axial high field watercooled and superconducting solenoids or transverse magnets, high differential sensitivity, convenient access to the sample environment, and use of standard commercially available electronic components. Details of the detection coil assembly, sample rotation devices, and low temperature accessories are presented along with a general discussion of the data processing techniques. Modifications for transverse field modulation and accurate orientation of the dc or modulation field with respect to the sample are also discussed. (Author)

AD-627 824 Fld. 20/3, 14/2, 8/14
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
A NUCLEAR MAGNETOMETER FOR MEASURING HIGHLY NON-UNIFORM MAGNETIC FIELDS,
by D. P. Vasilevskaya, and L. V. Vasilev. 1966, 7p. Rept. no. Translation-2077
TT TT-66-60481

Unclassified report

Trans. of Pribory i Tikhnika Eksperimenta (USSR) v10 n1 p174-7 1965.

Descriptors: (*Magnetometers, Design), Magnetic fields, Measurement, Quadrupole moments, USSR

A description if given of a nuclear magnetometer used for making precision measurements of magnetic fields with gradients of up to 1,000 to 3,500 oersteds/centimeter. The results of calculations for a field for two types of current quadrupoles creating a compensating gradient within the volume of an ampoule with the 'working medium' are given. (Author)

AD-627 910 Fld. 20/3
CFSTI Prices: HC $2.00 MF $0.50
MASSACHUSETTS INST OF TECH CAMBRIDGE
THE TEMPERATURE VARIATION OF THE GINZBURG-LANDAU PARAMETER IN NIOBIUM SINGLE CRYSTALS.
Technical rept.,
by Loren C. Skinner,II.. Jan 66, 50p. Rept. no. TR-1
Contract Nonr-3963 (16) Proj. NR-039-087

Unclassified report

Descriptors: (*Niobium, Magnetic properties), (*Superconductors, Magnetic properties), (*Magnetic properties, Superconductors), Single crystals, Cryogenics, Measurement, Theory, Temperature, Magnetic fields

Magnetization measurements were made on high purity Nb single crystals at temperature from 1.6 to 8.8K. The crystals were grown by the electron beam floating-zone technique and had resistivity ratios from 100 to 800. The upper and lower critical fields (Hsub c2 and Hsubc1) and the slope of the magnetization curve at the upper critical field, Hsubc2, were determined. The value of Hsubc2 and the slope at Hsubc2 require two separate phenomenological parameters, as has been predicted by the Maki-Tsuzuki linear approximation. The temperature dependence of the slope at Hsubc2 is best described by the Maki-Tsuzuki theory, but the temperature variation of Hsubc2 is best described by the Ginzburg-Bardeen theory. (Author)

AD-627 959 Fld. 20/3
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
ERZEUGUNG HOHER MAGNETFELDER (REPRODUCTION OF HIGH MAGNETIC FIELDS),
by Von Rolf Arndt. 1965, 14p. Contract AF49 (638)-1468
AFOSR 65-2586

Unclassified report

Availability: Published in Separatabdruck aus der Neuen Zurcher Zeitung, v7 p2-14 Apr 1965. Copies to DDC users only.

Descriptors: (*Magnets, Design), Magnetic fields, Solenoids, Electromagnets, Superconductivity, West Germany

AD-627 971 Fld. 20/3
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
EXCHANGE EFFECTS IN FERROMAGNETIC RESONANCE WITH NONLOCAL CONDUCTIVITY,
by L. L. Hirst, and R. E. Prange. 5 Mar 65, 11p. Contract AF-AFOSR-735-65 Proj. AF-9761 Task 976101
AFOSR 65-2109

Unclassified report

Availability: Published in The Physical Review, v139 n3A pA892-900 2 Aug 1965. Copies to DDC users only.

Descriptors: (*Ferromagnetic materials, Magnetic resonance), (*Ferromagnetism, Electrical conductance), Surface properties, Electrical impedance, Field theory, Iron alloys, Nickel alloys

A solution is obtained for the surface impedance of a ferromagnetic metal with a wave-number-dependent conductivity function, by an extension of the method of Reuter and Sondheimer. Computed curves are given for some specific cases. It is concluded that exchange effects are large under suitable low-temperature conditions, but there are too many unknown parameters to allow a very accurate value of the exchange constant to be deduced from resonance experiments. For extreme anomalous conductivity, exchange effects depend on the combination (exchange constant) X (conductivity) to the 2/3 power. (Author)

AD-627 380 See Fld. 20/12
AD-627 470 See Fld. 20/12
AD-627 480 See Fld. 20/9
AD-627 482 See Fld. 20/1
AD-627 492 See Fld. 9/5
AD-627 509 See Fld. 6/1
AD-627 658 See Fld. 10/1
AD-627 696 See Fld. 9/2
AD-627 735 See Fld. 20/13

AD-627 742 See Fld. 20/9

AD-627 749 See Fld. 20/2

AD-627 764 See Fld. 7/4

AD-627 775 See Fld. 20/2

AD-627 911 See Fld. 14/2

AD-628 017 See Fld. 17/7

AD-628 025 See Fld. 9/3

AD-628 029 See Fld. 20/9

20/4. FLUID MECHANICS

AD-627 317 Fld. 20/4
CFSTI Prices: HC $3.00 MF $0.75
ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN
A COMPARISON OF EXPERIMENTAL AND THEORETICALLY PREDICTED PRESSURE DISTRIBUTIONS AND FORCE AND STABILITY COEFFICIENTS FOR A SPHERICALLY BLUNTED CONE AT MACH APPROX. 18 AND ANGLES OF ATTACK,
by Eugene C. Knox, and Clark H. Lewis. Feb 66, 65p. Rept. no. AEDC-TR-65-234
Contract AF40 (600)-1200 Proj. AF-8953 Task 895303

Unclassified report

Descriptors: (*Conical bodies, Aerodynamic characteristics), (*Blunt bodies, Aerodynamic characteristics), Pressure, Stability, Hypersonic flow, Angle of attack, Distribution, Force (Mechanics), Mathematical prediction, Nose cones

Analysis of experimental pressure distributions and force and moment coefficients for a 9-deg half-angle spherically blunted cone is presented based on an ideal gas (γ = 1.4) three-dimensional characteristics solution developed by General Applied Sciences Laboratory (GASL). Comparisons are also made with predictions based on modified Newtonian theory.

AD-627 328 Fld. 20/4, 20/1
CFSTI Prices: HC $1.00 MF $0.50
NAVAL ORDNANCE TEST STATION CHINA LAKE CALIF
SMALL SUBMERGED SUPERSONIC GAS JETS. RESULTS OF A SERIES OF EXIT-STABILITY AND NOISE TESTS,
Research rept.,
by Howard V. L. Patrick. Jan 66, 25p. Rept. no. NOTS-TP-3971
NAVWEPS 9000

Unclassified report

Descriptors: (*Jets, Underwater), (*Supersonic flow, Underwater propulsion), (*Underwater sound, Jets), Stability, Bubbles, Jet mixing flow, Turbulence

High-speed photography revealed that several submerged supersonic gas jets were unstable and broke up into a bubbly water mixture very rapidly upon exit. Jet instability varied in amplitude at a frequency of approximately 300 cps. Over- or underexpansion of the jet did not noticeably affect jet instability. Occasionally, during periods of extremely high-amplitude pulsing, the jet would form a large bubble. The bubble would rapidly expand and disintegrate, generating a pressure wave of high intensity. A frequency spectrum analysis revealed noise with a bandwidth of approximately 50 to 4,500 cps, with a number of reinforced peaks. The spectrum shape varied little with chamber pressure, and therefore was not affected by over- or underexpansion of the gas jet. Neither jet instability nor resonating bubbles contributed noticeably to the noise spectrum. (Author)

AD-627 354 Fld. 20/4, 8/8, 8/3
CFSTI Prices: HC $3.00 MF $0.75
URS CORP BURLINGAME CALIF
EXPLOSION-GENERATED WAVE TESTS, MONO LAKE, CALIFORNIA: GROUND AND AERIAL PHOTOGRAPHY.
Final rept.,
by D. Walter. Jan 66, 74p. Rept. no. URS-654-2
Contract Nonr-4959 (00) Proj. NR-087-160

Unclassified report

Descriptors: (*Lake waves, Hydrodynamics), (*Hydrodynamics, Water waves), (*Water waves, Hydrodynamics), Lakes, California, Underwater explosions, TNT, Explosion effects, Motion picture photography

In the summer of 1965, a series of ten spherical cast TNT charges, each weighing approximately 10,000 lb were exploded at Mono Lake, California. As part of that program, URS Corporation conducted a project to acquire ground-based, high- and normal-speed, motion picture photography of base surge, plume, and wave run-up characteristics on all shots, and another to acquire aerial photography of wave refraction on two shots. The high-speed and normal-speed motion pictures show excellent detail of base surge and plume. Run-up information is good; on many films waves within waves can be seen near the shore. The aerial photography obtained is good, and wave generation, refraction, and run-up can readily be seen. (Author)

AD-627 423 Fld. 20/4
CFSTI Prices: HC $1.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
A NOTE ON THE CORRECTING OF MEASURED PRESSURES FOR FREE-STREAM FLOW GRADIENTS IN HYPERSONIC FLOW,
by R. A. Makofski. Mar 62, 24p. Rept. no. TG-437
Contract NOrd-7386

Unclassified report

Descriptors: (*Hypersonic flow, Pressure), Superaerodynamics, Measurement, Corrections, Wedges, Mathematical analysis, Two-dimensional flow

The effect of free-stream flow gradients upon the pressures measured along a thin body was studied. An expansion procedure using the Mach number gradient as the expansion parameter was used to determine the effect of these gradients upon the pressures measured on a wedge. These results were then used to determine the effect of the flow gradients upon other bodies, in particular, a flat plate with a blunted leading edge. A comparison with experimental and exact calculated values indicates that this method is in better agreement with the uniform flow pressure distribution than the methods presently in use. (Author)

AD-627 428 Fld. 20/4, 21/5
CFSTI Prices: HC $3.00 MF $0.75
MASSACHUSETTS INST OF TECH CAMBRIDGE GAS TURBINE LAB
BOUNDARY LAYER SEPARATION IN INTERNAL FLOW,
by Hal L. Moses, John R. Chappell, and Tomas Goldberger. Sep 65, 61p. Rept. no. 81
Contract Nonr-1841 (91)

Unclassified report

Descriptors: (*Flow separation, Boundary layer), (*Turbulent boundary layer, Diffusers), Stability, Conical bodies

An investigation of incompressible turbulent boundary layer separation in internal flow is presented with experimental results for a variable geometry, two -dimensional diffuser and two conical diffusers. A simple analytical model is adopted, which consists of wall boundary layers and a one-dimensional, inviscid core. Several approximate boundary layer methods and the possibility of extending them into the separated region are examined. With a limited amount of separated flow, the calculated pressure agrees reasonably well with the experimental results and gives a fair indication of maximum diffuser performance. The limitations of the model to the more general problem, as well as the problem of singularities and downstream stability, are discussed. (Author)

AD-627 433 Fld. 20/4
CFSTI Prices: HC $3.00 MF $0.75
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y
IRROTATIONAL AND ROTATIONAL SOLITARY WAVES IN A CHANNEL WITH ARBITRARY CROSS SECTION.
by Arthur S. Peters. Jan 66, 62p. Rept. no. IMM-345
Contract Nonr-285 (55) Proj. NR-062-160

Unclassified report

Descriptors: (*Water waves, Three-dimensional flow), Fluid mechanics, Potential theory, Boundary value problems, Equations of motion

This report is an investigation of irrotational and rotational solitary waves in a liquid of constant density contained in a channel with arbitrary cross section. The three-dimensional aspects of these waves are studied in some detail and they are compared with the properties of the classical two-dimensional solitary wave. (Author)

AD-627 453 Fld. 20/4
CFSTI Prices: HC $1.00 MF $0.50
AERONAUTICAL RESEARCH ASSOCIATES OF PRINCETON INC N J
INTERACTION PHENOMENA IN ROTATIONAL STREAMS.
Final rept.,
by Coleman deP. Donaldson. 29 Oct 65, 5p.
Contract AF49 (638)-1437
AFOSR 65-2208

Unclassified report

Descriptors: (*Fluid mechanics, Incompressible flow), (*Equations of motion, Fluid mechanics), Rotation, Numerical analysis, Partial differential equations

Methods were derived for solving equations of motion for an inviscid, incompressible fluid with rotation. These solutions are valuable in understanding fluids undergoing strong interactions. Both analytical and numerical approaches were made. It is concluded that a numerical approach is quite likely to be successful. (Author)

AD-627 472 Fld. 20/4
CFSTI Prices: HC $1.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
A REVIEW OF RESEARCH PERFORMED AT THE POLYTECHNIC INSTITUTE OF BROOKLYN, AEROSPACE INSTITUTE UNDER GRANT AF-AFOSR-62-409.
Final rept., 1 Sep 63-30 Sep 65,
by Martin H. Bloom, and Robert J. Cresci. Oct 65, 14p. Rept. no. PIBAL-897
Contract AF-AFOSR-62-409 Proj. AF-9783 Task 978301
AFOSR 65-2230

Unclassified report

Descriptors: (*Hypersonic characteristics, Scientific research), Slender bodies, Continuum mechanics, Reviews, Turbulent boundary layer, Chemical reactions, Boundary layer, Three-dimensional flow, Blunt bodies

Research is summarized on a theoretical analysis of continuum flow fields about hypersonic vehicles. Study of the asymptotic inviscid flow field about slender bodies is emphasized. Since indications are that for slender bodies transition in the boundary layer occurs at high altitudes, the turbu-

lent regime is given special attention. A consistent asymptotic solution is obtained for flows of perfect gases at infinite Mach number, and qualitative features of flows at large finite Mach number are considered. Three-dimensional boundary-layer problems are discussed. It is found that only in the two limiting cases of low and infinite external Mach number is boundary-layer similarity possible. Problems relating to chemical reactions in the boundary layer are also investigated. For the analysis, an approximate technique is used based on linearization about the Blasius solution. (Author)

AD-627 474 Fld. 20/4, 9/2
CFSTI Prices: HC $3.00 MF $0.75
GENERAL APPLIED SCIENCE LABS INC WESTBURY N Y
COMPUTER PROGRAMS FOR A REACTIVE TURBULENT BOUNDARY LAYER AIR VERSION.
Technical rept.,
by B. Bellow. 15 Sep 65, 88p. Rept. no. GASL-TR-549
Contract SD-149 ,ARPA Order-396 Proj. GASL-8030/1220

Unclassified report

Descriptors: (*Turbulent boundary layer, Programming (Computers)), (*Programming (Computers), Turbulent boundary layer), Differential equations, Energy, Two-dimensional flow, Chemical reactions

Computer programs for the calculation of properties within a reactive compressible turbulent air boundary layer on a flat plate are described. The pressure is constant throughout the boundary layer. The partial differential equations for energy and species mass conservation are solved with arbitrary initial conditions by a finite difference technique. A variable wall temperature boundary condition may be used. The boundary conditions at the edge of the boundary layer are constant with respect to the axial coordinate. The partial differential equations, which describe a two-dimensional diffusing flow, may be coupled to a system of equations describing a one-dimensional finite-rate air chemically reacting flow, and hence may be used in the numerical treatment of the two-dimensional reacting boundary layer. (Author)

AD-627 506 Fld. 20/4
MINNESOTA UNIV MINNEAPOLIS SCHOOL OF PHYSICS
GYROSCOPIC DETECTION OF PERSISTENT FLOW OF SUPERFLUID LIQUID HELIUM,
by J. B. Mehl, and W. Zimmermann,Jr.. 15 Apr 65, 4p. Contract AF-AFOSR-793-65
AFOSR 65-2085

Unclassified report

Availability: Published in Physical Review Letters v14 n20 p815-8 May 17 1965. Copies to DDC users only.

Descriptors: (*Liquefied gases, Fluid flow), (*Superfluidity, Helium), (*Helium, Superfluidity), Gyroscopes, Momentum

The gyroscopic technique provided a particularly good menas of establishing the existence of persistent flow and of studying its nature.

AD-627 609 Fld. 20/4, 1/3
CFSTI Prices: HC $2.00 MF $0.50
MICHIGAN UNIV ANN ARBOR DEPT OF AERONAUTICAL AND ASTRONAUTICAL ENGINEERING
INTERACTION EFFECTS OF A JET FLAP ON A 60 DEGREES DELTA WING AT MACH NUMBER 4, AND COMPARISON WITH TWO-DIMENSIONAL THEORY.
Technical rept.,
by James L. Amick, and Gerald F. Carvalho. Feb 63, 38p. Rept. no. 03942-15-T ,cm-1031
Contract NOrd-16595 Proj. ORA-03942

Unclassified report

Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.

Descriptors: (*Jet flaps, Aerodynamics), (*Aerodynamics, Jet flaps), Delta wings, Flat plate models, Wind tunnel models, Supersonic characteristics

Measured normal force increments due to a jet flap issuing perpendicularly from a flat plate wing are presented. Interaction effects caused a magnification of the jet force by a factor of 2.4 to 2.8, when the wing had a turbulent boundary layer. For a laminar boundary layer the jet force magnification ratio varied from 2.5 for the strongest jet tested, to 3.6 for a jet approximately one-tenth as strong. A three-fold change in slot width had very little effect on the interaction. The experimental results are compared with calculations based on a two-dimensional theory which makes use of empirical separation and base pressure data. The calculated interaction forces are larger than those obtained experimentally, but many of the trends are similar. The interaction is predicted to become increasingly more favorable as Mach number increases. At hypersonic speeds it is indicated that a jet flap wing may be competitive in lifting efficiency with a conventional wing at angle of attack, if operation at large lift coefficients is required. (Author)

AD-627 610 Fld. 20/4, 14/2
CFSTI Prices: HC $1.00 MF $0.50
TRW SYSTEMS REDONDO BEACH CALIF
ARPA WIND TUNNEL.
Quarterly progress rept. no. 1,
by L. A. Hromas. Jan 66, 3p. Rept. no. 6454-6014-T0000
Contract AF04 (694)-638

Unclassified report

Descriptors: (*Wind tunnel models, Aerodynamic characteristics), (*Slender bodies, Wake), Base flow, Injection, Wind tunnels, Reentry vehicles, Atmosphere entry

The purpose of the study is to make detailed flow measurements in the near wake of a slender twodimensional body having base fluid injection.

AD-627 655 Fld. 20/4
CFSTI Prices: HC $1.00 MF $0.50
STANFORD UNIV CALIF DEPT OF AERONAUTICS AND ASTRONAUTICS
A METHOD OF SERIES TRUNCATION APPLIED TO SOME PROBLEMS IN FLUID MECHANICS,
by Milton Van Dyke. Oct 65, 22p. Rept. no. SUDAER-247
Contract AF49 (638)-1274
AFOSR 65-2014

Unclassified report

Presented at Symposium on Advanced Problems and Methods in Fluid Dynamics (7th), Jurata, Poland, Sep 1965.

Descriptors: (*Fluid mechanics, Mathematical analysis), (*Series, Fluid mechanics), Partial differential equations, Blunt bodies, Aerodynamic configurations, Mathematical models

Topics include thin layers: the blunt body problem; changes of variable: an accurate blunt-body solution; Thick layers: viscous flow past circle and parabola; local truncations: viscous flow past a flat plate.

AD-627 668 Fld. 20/4
RICE UNIV HOUSTON TEX
THREE-DIMENSIONAL WINGS OF MINIMUM TOTAL DRAG IN NEWTONIAN FLOW,
by David G. Hull, and Angelo Miele. 1965, 8p.
Contract AF-AFOSR-828-65 Proj. AF-9749 Task 974901
AFOSR 65-2087

Unclassified report

Availability: Published in The Journal of the Astronautical Sciences v12 n2 p39-45 1965. Copies to DDC users only.

Descriptors: (*Wings, Drag), (*Drag, Reduction), Hypersonic flow, Leading edge, Thickness, Transformations (Mathematics)

The problem of minimizing the drag of a slender, 3-dimensional wing in hypersonic flow is considered under the following assumptions: the wing has two planes of symmetry; the wing is slender in both the chordwise direction and the spanwise direction; the span is prescribed; the thickness along the leading edge is zero; the angle of attack and the sideslip angle are zero; the pressure distribution is Newtonian; and the skin-friction coefficient is constant. The indirect methods of the calculus of variations in two independent variables are employed, and the minimum drag problem is solved for various conditions. If the volume is free while the trailing edge thickness distribution is given, the optimum surface is obtained by joining corresponding points of the leading edge and the training edge with straight lines; on the other hand, if the volume is given while the trailing edge thickness distribution is free, the optimum surface is obtained by joining corresponding points with a curve such that the complements of the locally normalized coordinates satisfy at 3/2-power law. The above results are valid regardless of the conditions imposed on the planform shape and the planform area. For all of the cases considered, analytical expressions are obtained for the aerodynamic drag and the drag coefficient. (Author)

AD-627 688 Fld. 20/4, 20/9, 22/3
CFSTI Prices: HC $1.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
A REVIEW OF RESEARCH PERFORMED AT THE POLYTECHNIC INSTITUTE OF BROOKLYN, AEROSPACE INSTITUTE.
Final rept. 1 Sep 62-30 Sep 65,
by Martin H. Bloom, and Robert J. Cresci. Oct 65, 25p. Rept. no. PIBAL-896
Contract AF-AFOSR-1-63 Proj. AF-9781 Task 978101
AFOSR 65-2007

Unclassified report

Descriptors: (*Magnetohydrodynamics, Reviews), (*Fluid mechanics, Reviews), (*Trajectories, Reviews), Hypersonic flight, Boundary layer, Injection, Vortices, Scientific research

An experimental and theoretical program connected with fluid mechanical and dynamical problems emanating from hypersonic flight is reported. Major emphasis was on the viscous free mixing of homogeneous streams, and the boundary layer flows including effects of deparation, mass injection or suction, unsteady flows, surface discontinuities, and vorticity. Reacting flows, space mechanics, and magnetohydrodynamic effects were also considered. The research is summarized and a bibliography of 33 reports and published papers resulting from this work is presented. (Author)

AD-627 695 Fld. 20/4, 3/1
CFSTI Prices: HC $2.00 MF $0.50
VON KARMAN INST FOR FLUID DYNAMICS RHODE-SAINT-GENESE (BELGIUM)
DEVELOPMENT OF METHOD FOR METEOR TRAJECTORY ANALYSIS.
Final scientific rept.,
by L. Moulin, and J. Develay. Nov 65, 41p.
Contract AF-EOAR-12-65
AFOSR 65-2940

Unclassified report

Descriptors: (*Meteors, Trajectories), (*Aerodynamic heating, Atmosphere entry), Geometry, Equations of motion, Brightness, Belgium

It can be concluded from the present analysis that a method has been developed to calculate the geo-

metry of natural meteors entering the atmosphere, and to deduce actual values of heat transfer coefficients and luminous efficiency factors, starting from observations of velocity, altitude and luminosity for various epochs. Systematic application of the method to a series of meteor data should lead to the formulation of correlations for heat transfer coefficients and luminous efficiency factors. From the particular case of meteor Meanook 132 it already appears that the drag coefficients plays a predominant role at high altitudes and high velocities, that heat transfer is considerably larger than anticipated and that the luminous efficiency factor may not be regarded as constant but increases as the body penetrates the atmosphere. (Author)

AD-627 704 Fld. 20/4
GENERAL APPLIED SCIENCE LABS INC WESTBURY N Y
PRESSURE DISTRIBUTION ON A SURFACE WITH LARGE NORMAL INJECTION.
Technical rept.,
by L. Ting. 1965, 20p. Rept. no. GASL-TR-588
Contract SD-149
Unclassified report

Presented at American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting (3rd), New York, N. Y. 24-26 Jan 1966.

Availability: Available from American Inst. of Aeronautics and Astronautics, 1290 Avenue of the Americas, New York, N. Y. AIAA Paper No. 66-89. HC $1.00. (AIAA Member $0.50).

Descriptors: (*Aerodynamic loading, Injection), (*Aerodynamic configurations, Load distribution), Pressure, Boundary layer, Hypersonic flow, Supersonic flow, Mathematical analysis, Incompressible flow, Wedges, Stagnation point, Ablation, Surfaces

The changes in forces acting on a body moving at high speed due to large normal injection are investigated. The velocity at the wall, v sub w, is assumed to be much larger than the value allowed for the boundary layer theory. On the other hand for a body moving at high speed, u sub e, it is justifiable to consider only v sub w << u sub e. The analysis is, therefore, based on these two conditions. On account of the first condition the flow field is governed by the inviscid equations with a discontinuity in velocity along the streamline which separates the inner region of the injected fluid from the outer region of free stream. On account of the second assumption, the flow field in the inner region can be assumed to be incompressible. Depending on the Mach number of the free stream and the body shape, one can use either linearized supersonic theory or others for the outer region. The boundary condition along the dividing streamline is then established. For the case of a wedge with constant stagnation pressure for the injectant, analytic solutions are obtained from which the force and moment can be computed. (Author)

AD-627 743 Fld. 20/4, 22/2
GENERAL APPLIED SCIENCE LABS INC WESTBURY N Y
MEASUREMENTS OF THE TURBULENT NEAR WAKE OF A CONE AT MACH 6,
by A. Martellucci, H. Trucco, J. Ranlet, and A. Agnone. 1965, 20p. Contract SD-149
Unclassified report

Presented at AIAA Aerospace Sciences Meeting (3rd), New York, N. Y. 24-26 Jan 1966.

Availability: Available from American Institute of Aeronautics and Astronautics, 1290 Avenue of the Americas, New York, N. Y. HC $1.00

Descriptors: (*Conical bodies, Wake), (*Hypersonic flow, Turbulence), (*Wake, Reentry vehicles), Atmosphere entry, Stagnation point, Pressure, Reynolds number, Measurement

A detailed investigation of the flow properties in the turbulent near wake of a circular cone and an elliptic cone was conducted. Both the circular cone and the elliptic cone were at zero angle of attack in a Mach 6 flow. The experiments were conducted at a stagnation pressure of 800 psia with a corresponding free stream Reynolds number of 14.4 million per foot. The boundary layer at the cone shoulder was turbulent for the entire test series. Detailed radial profiles of the total temperature, total and static pressures in the supersonic regions of the wake at several axial stations are presented. In addition, the static and total pressure along the centerline of symmetry in the recirculation zone, the u=o line, and the properties at the cone shoulder prior to the expansion into the base are also presented. Correlations of the distance to the downstream stagnation point, the maximum static pressure rise at the wake neck, and the axial static pressure along the axis of symmetry are made with other experimental data. (Author)

AD-627 798 Fld. 20/4, 20/13
CFSTI Prices: HC $3.00 MF $0.75
CORNELL AERONAUTICAL LAB INC BUFFALO N Y
SKIN FRICTION, HEAT TRANSFER, AND PRESSURE MEASUREMENTS ON HYPERSONIC INLET COMPRESSION SURFACES IN THE MACH NUMBER RANGE 7.5 TO 16.
Final rept. May 64-Dec 65,
by Melvin O. Ryder,Jr.. Dec 65, 93p. Rept. no. AA-1948-Y-3
Contract AF33 (615)-1845 Proj. AF-1366 Task 136605
AFFDL TR-65-199
Unclassified report

Descriptors: (*Duct inlets, Hypersonic characteristics), (*Hypersonic flow, Duct inlets), Skin friction, Heat transfer, Pressure, Surfaces, Boundary layer, Models (Simulations), Flow separation

An experimental study of boundary layer flow, under the influence of adverse pressure gradients typical of hypersonic inlets, was conducted on two two-dimensional and three axisymmetric compression surface models instrumented with skin friction, heat transfer and pressure gages. Tests were conducted over a Mach and Reynolds number range of 7.5 to 16 and 32,000 per ft. to 4,700,000 per ft., respectively. The boundary layers on the two-dimensional models were laminar and attached for all conditions tested. Local laminar separation occurred for some conditions of the axisymmetric tests. Boundary layer transition occurred for the high Reynolds number runs at a Mach number of 8 on the axisymmetric models but the adverse pressure gradients were not large enough to cause the turbulent boundary layers to separate. The skin friction gages gave a more accurate indication of localized boundary layer separation than either the heat transfer or static pressure distributions on the models tested.

AD-627 881 Fld. 20/4
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
NUMERICAL CALCULATIONS OF THE FLOW AROUND A FLARED CONE (CHISLENNII RASCHET OBTAKANIYA STUPENCHATOVO KONUSA),
by G. S. Roslyakov, and N. V. Drozdov. Dec 65, 22p. Rept. no. LT-65-19
TT 66-60490
Unclassified report

Trans. of mono. Chislennie Metodi v Gazovoi Dinamike. Sbornik Rabot Vichislitel novo Tsentra MGU, 11, Moscow 1963 p61-74.

Descriptors: (*Gas flow, Conical bodies), Shock waves, Supersonic flow, Wake, Vortices, Entropy, Differential equations

A method is presented for the numerical computation of the flow near a sharp nosed right circular cone-flare immersed in a supersonic ideal gas flow. It is assumed that the flow is uniform, the free-stream velocity vector is parallel to the axis of the body, and conditions are such that the conical nose shock is attached. It is further assumed that the flare (second cone) angle is greater than the cone angle, so that a curvilinear shock originating from the intersection of the cone-flare is generated. At some distance from the body both shocks intersect. In the region bounded by the shocks and the cone, the flow is conical and solutions of conic flows are given in tabular form. Beyond the curvilinear shock the flow becomes vortical and the calculating of it presents many difficulties. The vortical flow field, with the exception of the neighborhood of cone-flare intersection, is calculated by the method of characteristics. For the determination of the flow field near the intersection the results of an approximate theory are utilized. (Author)

AD-627 909 Fld. 20/4
CFSTI Prices: HC $1.00 MF $0.50
SPACE SCIENCES INC WALTHAM MASS
DRAG IN RAREFIED GASES.
Final rept.,
by S. Ziering. 18 Jan 66, 12p. Rept. no. SSI-5A-FR
Contract AF49 (638)-1228 Proj. AF-9783 Task 978301
AFOSR 66-0138
Unclassified report

Descriptors: (*Superaerodynamics, Drag), (*Drag, Superaerodynamics), Shock waves, Diffusion, Boundary layer, Kinetic theory, Leading edge, Transport properties, Upper atmosphere

The present objectives in near and far space provide for environments that ultimately transcend the domain of validity of continuum theory. An understanding of phenomena such as drag in the transition domain or near free molecular domain cannot be analyzed by continuum concepts. In order to understand flow properties in highly rarefied gases, new mathematical techniques and equations need to be formulated in lieu of the continuum equations no longer applicable. The ultimate objective is to develop methods that will provide guidance to spacedynamic designers of vehicles orbiting in rarefied atmospheres, and at the same time to establish a mathematical framework suitable for an understanding of the interaction of rarefied gases and physical boundaries. The work accomplished under this contract is best summarized by the titles and abstracts of the four technical papers generated in its performance, as follows: (1) Extension of Mott-Smith Method for a One Dimensional Shock Wave, (2) Kinetic Theory of the Leading Edge (3) Asymptotic Solutions of the Bhatnager -Gross-Krook Equation, and (4) Kinetic Theory of Diffusion in Rarefied Gases. (Author)

AD-627 925 Fld. 20/4
CFSTI Prices: HC $2.00 MF $0.50
CALIFORNIA INST OF TECH PASADENA HYDRODYNAMICS LAB
PARAMETERS AFFECTING CAVITATION AND SOME NEW METHODS FOR THEIR STUDY.
Final rept.,
by Albert T. Ellis. Oct 65, 48p. Rept. no. E-115.1
Contract Nonr-220 (44)
Unclassified report

Descriptors: (*Cavitation, High-speed photography), (*Hydrodynamics, Cavitation), (*Liquid jets, Cavitation), Damage, Water tunnels, Laser, Photographic recording systems

New experimental observations are presented which support the high speed jet mechanism of cavitation damage. A general discussion of the basic hydrodynamic theory involved is given and the importance of certain parameters on damage are pointed out. New techniques for studying the collapse of single cavities are described and the concept and development of a high speed photo-

graphic system using a ruby laser is outlined. Magnifications of up to fifty times at picture repetition rates as high as 1,600,000 per second and exposure times of 20 billionths of a second have been achieved. (Author)

AD-628 019 Fld. 20/4
CFSTI Prices: HC $3.00 MF $0.75
MASSACHUSETTS INST OF TECH CAMBRIDGE
MEASUREMENT OF VORTEX SEPARATION. PART II. THREE-DIMENSIONAL CIRCULAR AND ELLIPTIC BODIES.
Technical rept.,
by Eric G. Friberg. Aug 65, 88p. Rept. no. MIT-DSR-5139 ,TR-115
Contract N600 (19)61270

Unclassified report

Descriptors: (*Vortices, Flow separation), (*Flow separation, Vortices), (*Three-dimensional flow, Flow separation), Conical bodies, Fluid flow, Angle of attack, Flow visualization

An experimental investigation of vortex separation about three-dimensional circular and elliptic cones and an ogive cylinder using the hydrogen bubble technique for flow visualization is discussed. Data on the position of the vortex and location of the separation point of the vortex feeding sheet are presented as a function of angle of attack for angles up to thirty degrees. A semi-empirical formula is given to predict the separation position on a circular cone as a function of cone semi-apex angle and angle of attack over the range of angles tested. A semi -empirical formula is also given which predicts the location of separation on an elliptic cone of arbitrary axis-ratio as a function of angle of attack and some equivalent cone semi-apex angle. All data are presumed to be laminar. (Author)

AD-627 478 See Fld. 3/2

AD-627 484 See Fld. 20/13

AD-627 505 See Fld. 20/13

AD-627 703 See Fld. 7/4

AD-627 725 See Fld. 20/13

AD-627 730 See Fld. 20/13

AD-627 731 See Fld. 20/13

AD-627 898 See Fld. 1/1

AD-627 919 See Fld. 20/9

AD-627 962 See Fld. 20/11

AD-627 964 See Fld. 20/1

AD-627 972 See Fld. 12/1

AD-627 973 See Fld. 20/13

AD-628 000 See Fld. 19/4

20/5. MASERS AND LASERS

AD-627 353 Fld. 20/5, 20/12, 20/6
CFSTI Prices: HC $3.00 MF $0.75
TRG INC MELVILLE N Y
RESEARCH ON PROPERTIES OF LASER DEVICES.
Technical summary rept. no. 1, 15 Nov 64-15 May 65,
by N. Solimene. 15 May 65, 65p. Rept. no. TRG-034-TR-1. Contract AF49(638)-1535, ARPA Order-356 Proj. AF-5730

Unclassified report

Descriptors: (*Lasers, State-of-the-art reviews), (*Gas discharges, Lasers), (*Solid state physics, Lasers), Optics, Manganese, Vapors, Lanthanum, Yttrium, Photochemistry, Dissociation, Pumping (Optical)

Experimental work on gaseous and solid-state laser development is reported. The high temperature Mn collision laser tests indicated that insufficient gain was achieved to obtain oscillation with present apparatus. Experiments testing La and Y as collision laser media were concluded after demonstrating that higher discharge currents and higher operating temperatures than presently available were required. The possibility that photodissociation of thallum bromide in the presence of a quenching gas could lead to a population inversion was experimentally investigated. Mach-Zehnder interferograms of the transient optical path distortions introduced by optical pumping of ruby were obtained. An R1 ruby laser pumped by an R2 ruby laser experiment was designed and the construction of the apparatus initiated. (Author)

AD-627 363 Fld. 20/5, 20/9, 20/6
CFSTI Prices: HC $4.00 MF $0.75
COLUMBIA UNIV NEW YORK PLASMA LAB
OPTICAL AND ELECTRON INTERACTIONS WITH METASTABLES.
Technical rept.,
by Betram Pariser. 1965, 110p. Rept. no. 24
Contract Nonr-266 (93)

Unclassified report

See also AD-619 931.

Descriptors: (*Lasers, Plasma oscillations), (*Plasma medium, Quenching (Inhibition)), (*Pumping (Optical), Plasma medium), Atomic energy levels, Helium, Neon, Glow discharges, Plasma physics, Excitation

Afterglow plasmas are optically pumped with broadband radiation produced by a xenon flash lamp. The neon metastable concentration is decreased to less than 50 percent during the pumping, and a net depopulation results at the conclusion of the flash. A depopulation of the helium metastable is seen only during the pumping flash. By optically pumping neon metastables to the lower laser level, the laser lines (6328A and 1.15 microns) are quenched. Amplification of the 1.15 micron laser line is observed when the population of the upper laser level is increased by selectively pumping neon metastables. Metastable collisions with heated electrons also result in a depopulation of the neon concentration. With further heating, the electrons gain enough energy to increase the metastable population by colliding with neutral neon atoms. Biondi's theory on ionizing collisions is examined while controlling the metastable population with optical pumping. The experimental data support the theory that metastablemetastable collisions are an important ionization process in an afterglow. (Author)

AD-627 455 Fld. 20/5
HUGHES AIRCRAFT CO CULVER CITY CALIF AEROSPACE GROUP
GAIN IN A DIFFUSELY PUMPED RAMAN AMPLIFIER,
by D. P. Bortfeld, and W. R. Sooy. 15 Oct 65, 3p.
AROD 4408:2

Unclassified report

Availability: Published in Applied Physics Letters v7 n10 p283-5 Nov 15 1965. Copies to DDC users only.

Descriptors: (*Lasers, Pumping (Optical)), (*Gain, Lasers), Benzene, Ruby, Amplifiers, Oscillators

AD-627 456 Fld. 20/5, 20/6
OPTICS TECHNOLOGY INC BELMONT CALIF
FIBER OPTICS AND THE LASER,
by N. S. Kapany. 1965, 26p. Contract AF 49 (638)-1200 ,Nonr-4333 (00) Proj. AF-9767 Task 976702
AFOSR 65-1977

Unclassified report

Availability: Published in Annals of the New York Academy of Sciences v122 p615-37 May 28 1965. Copies to DDC users only.

Descriptors: (*Fiber optics, Lasers), (*Lasers, Fiber optics), Medical research, Tissues (Biology), Coagulation, Neodymium, Doping, Glass

The various applications made possible by the combination of the fields of lasers and fiber optics are discussed in some detail. The use of lasers in medicine for the coagulation of tissues accessible to direct observation and of tissues inside the human body inaccessible to direct observation, using laser-fiber optics endoscopes, is discussed. The possibility of using the fiber optics hypodermic probe, capable of ultraviolet excitation as well as laser coagulation in deep regions under the skin, are also discussed. More recent work done on lasing fibers, made possible with the availability of neodymiumdoped glasses, are described along with the output characteristics and potential applications.

AD-627 481 Fld. 20/5
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
PROGRESS IN SEMICONDUCTOR LASERS,
by Benjamin Lax. 1965, 15p. Contract AF49 (638)-1468
AFOSR 65-2023

Unclassified report

Availability: Published in IEEE Spectrum, p62-75 Jul 1965. Copies to DDC users only.

Descriptors: (*Lasers, Semiconductors), (*Semiconductors, Lasers), Pumping (Optical), Pumping (Electronics), Electron beams, Magnetic properties, Excitation, Reviews

The semiconductor laser field has progressed at a tremendous pace during the past few years. This article attempts to bridge the gap between the now-familiar injection laser and more recent work on optical photon and electron pumped lasers. (Author)

AD-627 489 Fld. 20/5
DUNHAM LAB YALE UNIV NEW HAVEN CONN
INVERSION MECHANISMS IN GAS LASERS,
by W. R. Bennett,Jr.. 1964, 32p. Contract AF-AFOSR-626-65
AFOSR 65-2066

Unclassified report

Availability: Published in Applied Optics Supplement 2 of Chemical Lasers, p3-33 1965. Copies to DDC users only.

Descriptors: (*Lasers, Gases), Pumping (Optical), Ions, Oscillators, Electron transitions, Helium group gases, Halogens, Carbon, Cesium, Mercury, Nitrogen, Oxygen, Sulfur, Carbon monoxide, Carbon dioxide, Heavy water, Ammonia, Water

A review of recent developments in the gas laser field is given which is intended to supplement a previous, more detailed paper by the author on the same subject. In addition, a number of new results have been described. The present paper has six main sections dealing with: a summary of general laser considerations, inversion saturation mechanisms in four-level systems, possible two- and three-level collision lasers, stimulated emission pumping, transient inversions, and ion lasers. Emphasis has been placed on atomic systems in this work and a summary of currently known gas laser transitions is included as an appendix to this paper. (Author)

AD-627 566 Fld. 20/5, 20/12
ILLINOIS UNIV URBANA DEPT OF ELECTRICAL ENGINEERING

LOCATION OF THE SOURCE OF RECOMBINATION RADIATION IN GA (ASL-XPX) P-N JUNCTIONS BY ELECTRON BOMBARDMENT,
by C. M. Wolfe, M. D. Sirkis, C. J. Nuese, N. Holonyak,Jr., and O. L. Gaddy. 27 Nov 64, 4p.
Contract AF19 (628)-4337 ,AF-AFOSR-714-65
Proj. AF-9763 Task 976302
AFOSR 65-2073

Unclassified report

Prepared in cooperation with Watkins-Johnson Co., Palo Alto, Calif.

Availability: Published in Journal of Applied Physics, v36 n6 p2087 Jun 1965. Copies to DDC users only.

Descriptors: (*Lasers, Luminescence), (*Luminescence, Sources), Electron bombardment, Carriers (Semiconductors), Gallium alloys, Arsenic alloys, Phosphorus alloys

The location of the source of recombination radiation is determined experimentally. Highly polished rectangular laser junctions were conductively mounted with the junction short-circuited on one side and with the opposite side exposed to free electron bombardment. Electron-hole pairs were injected uniformly at the junctions and on either side into n-type and p-type material. From observations of the sample at various beam current strengths, it was concluded that recombination radiation proceeds more efficiently and with shorter lifetime in material processing acceptor states; that is, in the junction region and slightly into the p-type side. Efficient recombination does not extend from the junction deep into the p-type side because in that direction the acceptor concentration increases sharply. Efficient recombination radiation does not extend at all from the junction into the n-type side. (Author)

AD-627 579 Fld. 20/5, 9/5
LAB NEW YORK
AN OPTICALLY PUMPED RB87 MASER OSCILLATOR.
Technical rept.,
by P. Davidovits. 1965, 6p. Rept. no. TR-4
Contract Nonr-4259 (10) ,DA-36-039-SC-90789
Proj. NR-373-250

Unclassified report

Availability: Published in Proceedings of the IEEE-NASA Symposium on Short-Term Frequency Stability, Goddard Space Flight Center, Greenbelt, Md., 23-24 November 1964, NASA SP-80, p171-5. Copies to DDC users only.

Descriptors: (*Masers, Rubidium), (*Microwave oscillators, Masers), Pumping (Optical), Frequency, Standards, Stability, Superhigh frequency

A self-sustained Rb87 maser oscillator has been developed. The maser oscillates on the Rb87 hyperfine transition frequency (approximately 6,835 Mc/sec). Because of its simplicity and potential frequency stability, the device promises to be a very useful frequency standard. (Author)

AD-627 593 Fld. 20/5
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
MOVING STRIATIONS IN A HE-NE LASER,
by A. Garscadden, P. Bletzinger, and E. M. Friar.
15 Jun 64, 4p. Proj. AF-4150 ,AF-7073
AFAL TR-65-117

Unclassified report

Availability: Published in Journal of Applied Physics v35 n12 p3432-3 Dec 1964. Copies to DDC users only.

Descriptors: (*Lasers, Gases), Helium, Neon, Glow discharges

Moving striation frequencies as a function of discharge current in dc gas laser are presented. A mutual influence of moving striations and laser action is also reported. (Author)

AD-627 690 Fld. 20/5
SLOANE PHYSICS LAB YALE UNIV NEW HAVEN CONN
EXCITATION AND INVERSION MECHANISMS IN GAS LASERS,
by W. R. Bennett,Jr.. 1965, 17p. Contract AF-AFOSR-626-65 Proj. AF-9767 Task 976702
AFOSR 65-2065

Unclassified report

Availability: Published in Annals of the New York Academy of Sciences v122 n2 p579-95 May 28 1965. Copies to DDC users only.

Descriptors: (*Lasers, Helium group gases), (*Excitation, Lasers), Masers, Pumping (Optical), Electron bombardment, Inelastic scattering, Electron transitions

Recent developments up to 1965 in the field of gas lasers are reviewed. Two excitation mechanisms, optical pumping by stimulated emission and electron impact, have made considerable progress. For most cw gas lasers, which are four-level systems, a buildup of the metastable level with increasing excitation produces a saturation bottleneck that severly limits the power output of the system. It is possible that this problem may be overcome by a three-level gas laser system. Pulsed and continuous laser oscillation in singly ionized states of the noble gases are considered. (Author)

AD-627 726 Fld. 20/5, 20/12
ILLINOIS UNIV URBANA DEPT OF ELECTRICAL ENGINEERING
STIMULATED CATHODO-LUMINESCENCE IN N-TYPE GAAS AT 77K,
by P. D. Coleman, and G. E. Bennett. 17 Feb 65, 2p. Contract AF33 (657)-10224 ,AF-AFOSR-272-65 Proj. AF-9767 Task 976702
AFOSR 65-2059

Unclassified report

Availability: Published in The Proceedings of the IEEE, v53 n4 p419-20 Apr 1965. Copies to DDC users only.

Descriptors: (*Semiconductors, Pumping (Optical)), (*Pumpint (Optical), Semiconductors), Electron bombardment, Gallium alloys, Arsenic alloys, Intermetallic compounds, Tellurium, Doping, Lasers, Excitation, Luminescence, Electron guns, Low-temperature research

Lasing behavior was observed in Te doped (3 x 10 to 18th power dopants/cc) GaAs under electron beam excitation. A 0-50 kv space-charge limited electron gun supplied the electron beam in the form of one sec pulses. Below threshold the peak of fluorescence remained at 8260 A and exhibited a 2.3 power dependence on the peak electron beam power. At threshold an increment in the beam power caused a 50-ns pulse of light to grow to 10 times the previous fluorescent light level. (Author)

AD-627 727 Fld. 20/5, 20/12
ILLINOIS UNIV URBANA DEPT OF ELECTRICAL ENGINEERING
STIMULATED CATHODOLUMINESCENCE. LASTING ACTION IN N-TYPE GAAS AT 4.2 DEGREES AND 77 DEGREES K BY FAST ELECTRON BOMBARDMENT,
by Paul D. Coleman, and Glenn E. Bennett. 1965, 16p. Contract AF33 (657)-10224 ,AF-AFOSR-272-65 Proj. AF-9767 Task 976702
AFOSR 65-2056

Unclassified report

lished in The 1965 NAECON Proceedings, p316-31. Copies to DDC users only.

Descriptors: (*Pumping (Optical), Semiconductors), (*Semiconductors, Pumping (Optical)), Lasers, Arsenic alloys, Gallium alloys, Intermetallic compounds, Electron bombardment, Luminescence, Low-temperature research

An experimental study in pumping bulk n-type GaAs was conducted by bombarding the material with a 15 to 50 kv pulsed electron beam. Hole-electron pairs were created which can recombine by a radiative process across the band gap of the semiconductor. This work demonstrates that bulk semiconductors can readily be pumped with electron beams in the 20 to 40 kv range. There is reason to believe that doped insulator laser materials could also be pumped by this method. (Author)

AD-627 967 Fld. 20/5
TRG INC MELVILLE N Y
ON THE THEORY OF LASER OSCILLATION,
by S. R. Barone. 1964, 1p. Contract AF49 (638)-673
AFOSR 65-2817

Unclassified report

Availability: Published in Conference on Quantum Electrodynamics of High Intensity Photon Beams, U. S. Army Research Office, Durham 26-27 Aug 1964. Copies to DDC users only.

Descriptors: (*Lasers, Oscillation), Field theory, Atomic energy levels

Conventional theories of laser oscillation neglect the effect of the oscillating field on the atomic response function except in so far as this field determines the atomic populations. We have attempted to go beyond this by considering the atomic response function to be determined in self-consistent fashion by the oscillating field. The model chosen for calculation consists of two-level atoms and a single (lossy) cavity mode. Retaining only the lowest order correlations between the two-level systems and the field, new effects appear for large values of the oscillating spectral energy density. For example, under suitable circumstances the oscillating line width can be substantially smaller than the value predicted by the Townes formula. (Document quoted in its entirety).

AD-628 020 Fld. 20/5, 20/1, 20/6
CFSTI Prices: HC $2.00 MF $0.50
MICROWAVE ELECTRONICS CORP PALO ALTO CALIF
STUDY OF PHONON-OPTICAL INTERACTIONS.
Final rept.,
by F. A. Olson, and V. R. Johnson. Nov 65, 46p.
Contract AF49(638)-1330 Proj. AF-9768
AFOSR 65-2647

Unclassified report

Descriptors: (*Lasers, Acoustic properties), (*Phonons, Photons), (*Photons, Phonons), Modulation, Optical properties, Pumping (Optical), Ruby

Exploratory research is described concerning phononphoton interactions in optical sources. These include a theoretical description of Bragg and Raman-Nath scattering caused by propagation of a plane acoustic wave through the path of a laser beam. This interaction is considered for intracavity operation with possibilities of modulation, frequency translation and output coupling. The conditions for synchronous mode operation are described. Modulation of an injection laser is considered on a theoretical basis with suggestions as to what results are to be attained and how the concept may be tested. Because boundary conditions are indeterminate for the injection laser, it was felt that experimental research should first deal with the intracavity modulation and coupling in an optically pumped laser. The interaction was tested in a ruby laser. The prime problem was associated with strains set up by the thermal shock created when the laser was operated in a pulsed mode. 850 Mc acoustic wave interaction was observed in the laser, its magnitude slightly above the noise level. (Author)

AD-627 266 See Fld. 14/5

AD-628 025 See Fld. 9/3

AD-628 027 See Fld. 7/4

20/6. OPTICS

AD-627 333 Fld. 20/6, 11/3
CFSTI Prices: HC $2.00 MF $0.50
BAUSCH AND LOMB INC ROCHESTER N Y RESEARCH AND DEVELOPMENT DIV
INFRARED COATING STUDIES.
Quarterly rept. no. 10, 14 Sep-14 Dec 65,
by A. Francis Turner. 14 Dec 65, 30p. Contract DA-44-009-AMC-124 (T)
Unclassified report

Descriptors: (*Infrared filters, Films), (*Infrared radiation, Reflection), (*Films, Infrared radiation), (*Optical coatings, Infrared radiation), Infrared optical materials, Magnesium compounds, Oxides, Zinc alloys, Tellurium alloys, Refractive index, Ceramic materials

An investigation was made of the reststrahlen properties of MgO films prepared under various conditions of evaporations. The results not only opened up the possibility of making infrared reflection-type filters with practically no restrictions to the plate size, but also the making of transmission interference filters using reststrahlen film materials in the wavelength range beyond 20 microns. Highly oriented polycrystalline films of MgO were prepared. The reststrahlen reflectivity of such films were described by the Lorentzian dispersion theory with only slight modifications to the parameters used to describe the bulk MgO crystals. Calculations of the enhancements of MgO films were made. Discussions and results of the study are presented in the following sections. Also included in this report are some data of the complex index of refraction of ZnTe film in the region of wavelength about 3 microns. As the films are slightly absorbing, both T and R were measured for the determination of n and k.

AD-627 405 Fld. 20/6, 20/14
CFSTI Prices: HC $3.00 MF $0.75
AEROJET-GENERAL CORP AZUSA CALIF
STUDY AND PERFORMANCE EVALUATION OF COLOR CODING RETICLE.
Final rept. 1 Jul 63-31 Mar 64,
by Martin Bressler, and W. J. Helm. May 64, 62p. Rept. no. 2835
Contract AF33 (657)-11401
AL TDR-64-97
Unclassified report

Descriptors: (*Radiometers, Reticles), (*Reticles, Colors), Coding, Infrared optical systems, Interference analyzers, Moon, Measurement, Germanium, Sky brightness, Spectra (Infrared), Quartz, Sapphires, Temperature, Frequency, Background, Infrared radiation

The purpose was to demonstrate the increased capabilities and uses of infrared measurement systems equipped with a color coding reticle. The CCR is an interference device used to convert an optical spectrum into an analogous frequency spectrum -- i.e., to encode color or wavelength information as frequency. The CCR principle entails moving a wedge of germanium through a pencil of rays from a collecting optical system such that the interference between reflections from the two surfaces provides the wavelength-dependent modulation mechanism. The germanium (Ge) wedge is deposited on the surface of a transparent substrate disc in the form of two half circle ramps. This configuration presents a constantly varying thickness of Ge to the incident radiation by simply rotating the substrate disc. The CCR was incorporated into an existing Aerojet radiometer (Model M4X). The germanium deposition techniques resulted in a color coding reticle with a spectral resolution of a fractional bandwidth ranging from approximately 3% at 1.8 microns to 9% at 5 microns.

AD-627 426 Fld. 20/6, 9/1, 9/5
CFSTI Prices: HC $1.00 MF $0.50
WESTINGHOUSE ELECTRIC CORP ELMIRA N Y ELECTRONIC TUBE DIV
APPLICATION OF LIGHT AND IMAGE INTENSIFICATION.
Monthly technical engineering rept. no. 27, 1-30 Sep 65,
by D. C. Fowlis, R. D. Harder, and Z. Szepesi. 29 Oct 65, 10p. Contract N61339-1440
Unclassified report

See also AD-620 318.

Descriptors: (*Image intensifiers (Electronics), Preparation), (*Photoelectric materials, Image intensifiers (Electronics)), Luminescence, Photoconductivity, Cadmium alloys, Selenium alloys, Zinc compounds, Sulfides, Cadmium compounds, Powders, Films, Sintering, Sandwich panels, Gain

Several 6 in x 6 in size low resolution type image intensifier panels were fabricated. The panels could be classified in two groups: (1) high gain-slow panels with standard luminous gains of several hundred; (2) low gainfast panels with gains in the order of ten. Panels of the last group had decay time constants lower than 20 milliseconds and proved to be acceptable for movie film projection display. The fabrication of double-layer CdS-CdSe panels was unsuccessful. Some image intensifier panels were constructed using the evaporated E1 films sandwiched with CdS PC powder embedded in epoxy resin. The maximum resolution of these panels was 250 lines/inch, and the maximum gain was around ten. A very disturbing nonuniformity exists on these panels which has to be eliminated before any practical use can be made of them. (Author)

AD-627 720 Fld. 20/6, 20/12
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING
INFRARED REFRACTIVE INDEX AND ABSORPTION OF INAS AND CDTE,
by O. G. Lorimor, and W. G. Spitzer. 12 Oct 64, 7p. Contract AF-AFOSR-496-65 Proj. AF-4751
AFOSR 65-2063
Unclassified report

Availability: Published in Journal of Applied Physics, v36 n6 p1841-4 Jun 1965. Copies to DDC users only.

Descriptors: (*Infrared radiation, Refractive index), (*Refractive index, Semiconductors), (*Absorption, Semiconductors), Indium alloys, Arsenic alloys, Cadmium alloys, Tellurium alloys, Dielectric properties, Crystal lattices

Transmission interference fringes from 2690 to 320/cm for InAs and from 1330 to 320/cm for CdTe have been analyzed with classical dispersion theory to obtain the room-temperature dielectric constants. For InAs the dielectric constant between the band edge and the reststrahl C and the static dielectric constant D are: C = 11.8 plus or minus 0.1, D = 14.55 plus or minus 0.3; and for CdTe: C = 7.05 plus or minus 0.05, D = 10.60 plus or minus 0.15. These values agree favorably with previously reported values. The absorption of InAs has been measured from 2500/cm, near the fundamental absorption edge, to 260/cm. Eight absorption peaks were observed between 444 and 269/cm which are attributed to multiphonon combinations with the following characteristic phonon frequencies: TO1 = 222/cm, TO2 = 214/cm, LO = 196/cm, and LA = 143/cm. The transmission of CdTe has been observed from 10,000 to 220/cm. From 10,000 to 450/cm the transmission is essentially constant at 60%. Below 400/cm only two previously reported transmission minima were observed. (Author)

AD-627 733 Fld. 20/6
ROCHESTER UNIV N Y DEPT OF PHYSICS AND ASTRONOMY
COHERENCE PROPERTIES OF OPTICAL FIELDS,
by L. Mandel, and E. Wolf. 1965, 59p. Contract AF-AFOSR-237-65 Proj. AF-9767 Task 976702
AFOSR 65-2057
Unclassified report

Availability: Published in Reviews of Modern Physics v37 n2 p231-87 Apr 1965. Copies to DDC users only.

Descriptors: (*Electromagnetic fields, Optics), (*Optics, Electromagnetic fields), Field theory, Quantum mechanics, Light, Polarization, Optical phenomena

This article presents a review of coherence properties of electromagnetic fields and their measurements, with special emphasis on the optical region of the spectrum. Analyses based on both the classical and quantum theories are described. After a brief historical introduction, the elementary concepts which are frequently employed in the discussion of interference phenomena are summarized. The measure of second-order coherence is then introduced in connection with the analysis of a simple interference experiment and some of the more important second-order coherence effects are studied. Their uses in stellar interferometry and interference spectroscopy are described. Analysis of partial polarization from the standpoint of correlation theory is also outlined. The general statistical description of the field is discussed in some detail. The recently discovered universal 'diagonal' representation of the density operator for free fields is also considered and it is shown how, with the help of the associated generalized phase-space distribution function, the quantum-mechanical correlation functions may be expressed in the same form as the classical ones. The sections which follow deal with the statistical properties of thermal and nonthermal light, and with the temporal and spatial coherence of blackbody radiation. Later sections, dealing with fourth- and higher-order coherence effects include a discussion of the photoelectric detection process. (Author)

AD-627 815 Fld. 20/6, 7/4
CFSTI Prices: HC $2.00 MF $0.50
MALLINCKRODT CHEMICAL LAB HARVARD UNIV CAMBRIDGE MASS
A DOUBLE RESONANCE MODULATED MICROWAVE SPECTROMETER.
Technical rept.,
by R. C. Woods,III, E.Bright Ronn, and Wilson,Jr.. 1966, 26p. Contract Nonr-1866 (14) Task 14
Unclassified report

Descriptors: (*Spectrum analyzers, Microwave spectroscopy), (*Microwave spectroscopy, Spectrum analyzers), Molecular spectroscopy, Frequency modulation, Resonance, Stark effect, Molecular energy levels

A practical non-Stark modulated double resonance microwave spectrometer has been constructed and tested in which frequency modulation is applied to one (strong) microwave source, the power from which passes through the sample gas but is prevented from reaching the crystal by filters. The second source does reach the crystal but is unmodulated. The modulation is therefore transmitted to the crystal and tuned amplifier exclusively via the phenomenon of double quantum absorption. The only transitions observed are those which occur as active pairs involving a common energy level, the two frequencies being near the two source frequencies. This provides extremely specific spectra for identification in complex situations, and is a convenient way of searching for linked transitions which are useful for assignment purposes. Because no Stark electrode is needed,

it is easier to construct special absorption cells such as coiled guides, high temperature cells, free space paths, etc. (Author)

AD-627 995 Fld. 20/6, 20/10
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
THE LIMIT CROSS SECTION OF THE RADIATION BEAM FROM AN OPTICAL QUANTUM GENERATOR,
by N. G. Basov, E. N. Belenov, and V. S. Letokhov. 5 Nov 65, 8p. Rept. no. FTD-TT-65-1003 TT 66-60500
Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady, v161 n4 p799-801 1965.

Descriptors: (*Beams (Electromagnetic), Generators), (*Optical equipment, Quantum mechanics), (*Quantum mechanics, Generators), Field theory, Diffraction, Pulse generators, USSR

This article examines the limitations on the cross section of the radiation beam from optical quantum generators. In optical quantum generators of a steady state, when there are extremely high transverse resonator dimensions, a cross section limitation of the radiation beam is theoretically possible because of a retardation of reciptocal action in the remote ranges of the generator, or a detuning of theeigen-frequencies of discrete resonator sections. In optical pulse generators (generators with a Q-modulation (1,2), the cross section limitation arises because the process of radiation generation by the material occurs during the stabilization sequence period of the resonator's oscillation modes. (Author)

AD-627 350 See Fld. 17/8

AD-627 353 See Fld. 20/5

AD-627 363 See Fld. 20/5

AD-627 456 See Fld. 20/5

AD-627 696 See Fld. 9/2

AD-627 747 See Fld. 20/12

AD-627 756 See Fld. 7/4

AD-627 779 See Fld. 20/12

AD-627 780 See Fld. 8/10

AD-627 806 See Fld. 19/6

AD-627 954 See Fld. 7/4

AD-627 960 See Fld. 20/12

AD-627 991 See Fld. 9/1

AD-628 017 See Fld. 17/7

AD-628 020 See Fld. 20/5

20/7. PARTICLE ACCELERATORS

AD-627 324 Fld. 20/7
CFSTI Prices: HC $1.00 MF $0.50
FLOYD NEWMAN LAB OF NUCLEAR STUDIES CORNELL UNIV ITHACA N Y
FINAL REPORT.
Rept. for 1 Feb 56-31 Jul 64,
by Robert R. Wilson. 31 Jul 64, 25p. Contract Nonr-401 (26)
Unclassified report

Continuation of Contract N6onr-264 (03). See also PB-137 054.

Descriptors: (*Snychrotrons, Design), Electron accelerators, Particle accelerator components, Nuclear reactions, Electrons, Mesons

The synchrotron was modified to increase the operating energy from 1.3 Gev to a design energy of 2.2 Gev. At the same time a proposal was generated for the design and construction of a 10 Gev electron synchrotron. The modification of the 1.3 Gev synchrotron was conceived in July, 1962, and the major design features were completed by April 1963. Construction progressed during the last half of 1963, and on January 20, 1964, the 1.3 Gev machine was turned off and assembly and modification was begun. A beam was first obtained in the modified machine on April 28, 1964, just a little over three months after tear-down and assembly was begun. The next month was used in making final modifications and adjustments.

AD-627 329 Fld. 20/7
CFSTI Prices: HC $2.00 MF $0.50
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH
THE PRODUCTION OF LARGE-DIAMETER LOW-VOLTAGE ELECTRON BEAMS IN THE ABSENCE OF A MAGNETIC FIELD,
by M. J. Kofoid, and P. Zieske. Jun 65, 48p. Rept. no. D1-82-0448
Unclassified report

Also available from the author.

Descriptors: (*Electron beams, Production), Electron guns, Focusing, Space charges, Voltage

The production of long 10 mm diameter electron beams in the absence of a magnetic field was studied experimentally. The gun design is described at length. Pencil beams of several hundred eV energy were obtained in noble gases in the 1-20 microns pressure range. However, measurements disclosed that in these space-charge focused beams there may be a severe diminution of beam electron current with axial distance from the gun. Analyses showed that a large low-energy electron population exists in the beam volume, forming with the neutralizing positive ions a plasma in which two-stream instabilities can develop and produce the spread found in the energy of the primary beam electrons. Space potential measurements showed that a positive potential well existed in the beam volume, resulting in the trapping of the low-energy electrons. The unavoidable presence of this relatively large population of low-energy electrons in the beam volume prevented precise measurements of the high-energy beam electron current; reasonable measurements were obtained through special experimental precautions. The beams were studied over a range of the parameters of pressure and beam current, energy, and length. (Author)

AD-627 351 Fld. 20/7
CFSTI Prices: HC $5.00 MF $1.00
NEVIS LABS COLUMBIA UNIV IRVINGTON-ON-HUDSON N Y
MODIFICATION PROGRAM FOR THE NEVIS SYNCHROCYCLOTRON,
by James Rainwater. Jan 66, 161p. Rept. no. R-536 ,Nevis-144
Contract Nonr-266 (72)
Unclassified report

Descriptors: (*Synchrocyclotrons, Design), Models (Simulations), Cyclotrons, Cyclotron magnets, Frequency modulation, Electromagnetic shielding, Proton beams, Muons, Pions, Vacuum, Ion sources

The plan envisages an eventual conversion to 500-600 MeV proton kinetic energy and > or = 10 microamp time average current. It is hoped to obtain a high extraction efficiency which will permit a 10 to 50 microamp time average external proton beam current having a high duty factor, with corresponding high intensity pion and muon beams. This program will involve a major building and shielding, etc. extension. It is planned to use spiral ridge iron shims with <B (r)> (average over azimuth) increasing with r more slowly than for isochronism, but by an amount which will give a greatly reduced rf frequency swing. This should permit a repetition rate of about 300/sec. The design study will rely strongly on the use of one-fifth scale cyclotron model magnet for field studies. Using a vacuum system, ion source, frequency modulated rf system, etc., it will also be used for central region studies using spiral ridge iron shimming. This model operating FM cyclotron may also be ued for a partial investigation of extraction modes where the protons would emerge along a high spiral angle valley field contour. (Author)

20/8. PARTICLE PHYSICS

AD-627 517 Fld. 20/8
CFSTI Prices: HC $2.00 MF $0.50
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
NEUTRON FORM FACTORS FROM A STUDY OF INELASTIC ELECTRON SPECTRA IN THE ELECTRODISINTEGRATION OF DEUTERIUM,
by E. B. Hughes, T. A. Griffy, R. Hofstadter, and M. R. Yearian. Jan 66, 33p. Rept. no. HEPL-420
Contract Nonr-255 (67) ,NSF-GP-948
Unclassified report

Descriptors: (*Neutrons, Nuclear structure), (*Electron bombardment, Deuterium), (*Deuterons, Inelastic scattering), Electrons, Deuteron cross sections, Nuclear magnetic moments, Momentum

Measurements of the ratio of the total inelastic electrondeuteron cross section to the elastic electron-proton cross section were made to an accuracy of about 3% for values of the square of the four-momentum transfer in the range 1.5 to 7.5/F-sq. These ratios were analyzed in terms of the form factors of the neutron using the 'area method', and it is concluded that the corrections necessary to the simple sum rule given by Jankus are approximately equal in magnitude to those encountered in the use of the more familiar 'peak method'. A detailed comparison was made between the shapes of the observed inelastic electrondeuteron cross sections as a function of the scattered electron momentum and the shapes expected according to a theoretical treatment due to Durand. (Author)

AD-627 564 Fld. 20/8
OHIO STATE UNIV COLUMBUS DEPT OF CHEMISTRY
GENERALIZED OSCILLATOR STRENGTHS AND ELECTRONIC COLLISION CROSS SECTIONS FOR NITROGEN AT EXCITATION ENERGIES ABOVE 10 EV,
by S. M. Silverman, and Edwin N. Lassettre. 13 Aug 64, 12p. Contract AF19 (122)-142 AFOSR 65-2176
Unclassified report

Prepared in cooperation with Mellon Inst., Pittsburgh, Pa., Grant AF-AFOSR-61-63. See also PB-135 521.

Availability: Published in The Journal of Chemical Physics, v42 n10 p3420-9 15 May 1965.

Descriptors: (*Nitrogen, Electron transitions), (*Electron transitions, Nitrogen), Nuclear cross sections, Excitation, Kinetic energy, Refractive index, Scattering, Probability, Electron bombardment, Atomic energy levels

Collision cross sections and generalized oscillator strengths have been determined for each of thirteen transitions in nitrogen whose excitation energies lie in the interval 10 to 83 ev. Only the generalized oscillator strengths have been reported since the collision cross sections can be calculated from these. Incident kinetic energy was approximately 500 volts in each case.

AD-627 627 Fld. 20/8, 7/4
CALIFORNIA UNIV LA JOLLA DEPT OF PHYSICS
DISPERSION THEORY OF THE KONDO EFFECT,
by H. Suhl. 30 Nov 64, 10p. Contract AF-AFOSR-610-64
AFOSR 65-2540

Unclassified report

Availability: Published in The Physical Review v138 n2A pA515-23 Apr 19 1965. Copies to DDC users only.

Descriptors: (*Electrons, Potential scattering), (*Paramagnetic resonance, Impurities), Nuclear spins, Atomic energy levels, Resonance scattering, Perturbation theory, S-matrix

According to recent work by Kondo, the scattering cross section of an electron in exchange interaction with a paramagnetic impurity immersed in a Fermi sea of electrons has a logarithmic infinity as the electron energy approaches the Fermi energy. We examine this problem by means of the Chew-Low method first devised for meson-nucleon scattering. It is found that the singularity is replaced by a resonant scattering close to the Fermi level. (Author)

AD-627 633 Fld. 20/8
INSTITUTE OF THEORETICAL PHYSICS STANFORD UNIV CALIF
HYPERFINE STRUCTURE AND WEAK INTERACTIONS,
by J. Barclay Adams. 22 Mar 65, 4p. Contract AF49 (638)-1389 Proj. AF-9751 Task 975101
AFOSR 65-2096

Unclassified report

Availability: Published in The Physical Review, v139 n4B pB1050-1 23 Aug 1965. Copies to DDC users only.

Descriptors: (*Hyperfine structure, Nuclear reactions), (*Nuclear reactions, Fermions), Elementary particles, Meson capture, Electrons, Protons, Muons, Positrons

The contribution of possible four-fermion V-A weak interactions to the hyperfine splitting is considered for the hydrogen-like bound systems (e-,p+), (muon (-), p+), (e-, muon (+)), and (e-,e+). The effect might have experimental signifiance (19 parts per million) for the (muon (-), p+) system. (Author)

AD-627 677 Fld. 20/8
NEW SOUTH WALES UNIV KENSINGTON (AUSTRALIA) DEPT OF APPLIED MATHEMATICS
A COMPLETE CLASSIFICATION OF THREE-NUCLEON STATES,
by T. Kalotas, and L. M. Delves. 12 Jun 64, 6p. Contract AF-AFOSR-62-400 Proj. AF-9751 Task 975101
AFOSR 65-2796

Unclassified report

Availability: Published in Nuclear Physics v60 p363-8 1964. Copies to DDC users only.

Descriptors: (*Nuclear energy levels, Tritons), (*Tritons, Nuclear energy levels), Nucleons, Nuclear spins, Parity, Wave functions, Euler's angles

The classification of three-nucleon states given by Derrick and Blatt for the triton (J = 1/2, pi = +) is extended to states of arbitrary J (pi). (Author)

AD-627 679 Fld. 20/8
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
LONG-RANGE ELECTROMAGNETIC FORCES ON NEUTRAL PARTICLES,
by G. Feinberg, and J. Sucher. 7 May 65, 16p. Contract AF-AFOSR-500-64
AFOSR 65-2794

Unclassified report

Prepared in cooperation with Columbia Univ., N.Y. Dept. of Physics.

Availability: Published in The Physical Review v139 n6B pB1619-33 Sep 20 1965. Copies to DDC users only.

Descriptors: (*Elementary particles, Photonuclear reactions), (*Electromagnetic fields, Elementary particles), Photons, Nuclear forces, Field theory, K mesons, Potential scattering, Charged particles

The long-range forces, i.e., those falling off as a power of the distance, which may act between pairs of particles, one of which is neutral and spinless are considered. It is shown that these forces may easily be calculated from the discontinuity function in the momentum transfer of the scattering amplitude for the two particles. The two -photon exchange force between two neutral, spinless systems, and the three-photon echange force between a charged and a neutral, spinless system were investigated. In the former case, the potential behaves as r to the -7th power for large r, in contradiction to the London expression for the Van der Waals force, and in agreement with the result of Casimir and Polder. For the latter case, the potential is odd under charge conjugation and hence can convert a K sub 2 meson to a K sub 1 meson. It is found that the potential behaves as r to the -7th power. It is found that such long-range electromagnetic interactions are presently unobservable in particle physics. (Author)

AD-627 728 Fld. 20/8
CALIFORNIA UNIV BERKELEY DEPT OF PHYSICS
DECAY MODES OF SPIN-TWO MESONS,
by Sheldon L. Glashow, and Robert H. Socolow. 18 Jun 65, 5p. Contract AF-AFOSR-232-65

AFOSR 65-2797

Unclassified report

Availability: Published in Physical Review Letters, v15 n7 p329-33 16 Aug 1965. Copies to DDC users only.

Descriptors: (*Decay schemes, Mesons), (*Mesons, Decay schemes), Nuclear spins, Meson reactions, K mesons, Pions

The observed partial decay widths of spin-two mesons are compared with theoretical predictions based on SU (3).

AD-627 744 Fld. 20/8
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
PARTIAL WAVE DISPERSION RELATIONS FOR PIONIC DISINTEGRATION OF DEUTERON,
by Kashyap V. Vasavada. 2 Mar 65, 49p. Contract AF-AFOSR-500-64 ,NSF-GP-1193
AFOSR 65-2793

Unclassified report

Availability: Published in Annals of Physics v34 n2 p191-237 1965. Copies to DDC users only.

Descriptors: (*Deuterons, Decay schemes), (*Pions, Meson scattering), Quantum mechanics, Wave functions, Phase shift, Nucleons, Proton scattering

A dispersion theoretic approach is made within the framework of partial wave dispersion relations to understand the pionic disintegration of the deuteron at low energies. The reaction amplitude is expressed in terms of six independent Lorentz invariant scalar functions which are free from kinematical singularities, and the partial wave helicity amplitudes are obtained. Dispersion relations are written after removing kinematical singularities. After some approximations, the dispersion relations become soluble integral equations of the Omnes-Muskhelishvilli type. The contribution of the left hand single nucleon exchange cuts is evaluated exactly. The left hand anomalous contribution is evaluated approximately by replacing the cuts by poles in the appropriate channels. Analytic continuation in the deuteron mass gives the contribution of the right hand anomalous cut. Pat of the right hand cut due to the two protons intermediate state is taken into account by using the experimental energy dependent phase shift parameters for proton proton scattering. The intermediate state containing two nucleons and one pion is effectively replaced by one particle and a resonance, and model amplitudes are used to evaluate the contribution. (Author)

AD-627 773 Fld. 20/8, 20/10
YALE UNIV NEW HAVEN CONN
THE ONE DIMENSIONAL SOLUBLE PARTICLE TRANSFER PROBLEM AND THE MODIFIED ENERGY MATRIX METHOD,
by Y. Nishida. 4 Jun 65, 9p. Contract AF-AFOSR-394-64
AFOSR 65-2688

Unclassified report

Availability: Published in Annals of Physics v34 n3 p415-23 Oct 1965. Copies to DDC users only.

Descriptors: (*Nucleons, Transport properties), (*Quantum mechanics, Nuclear reactions), Matrix algebra, Potential theory, Wave functions, Probability

The comparison of the modified energy matrix treatment of the particle transfer problem with the exact solution available in a special one dimensional case which has been made by Breit is analyzed and carried out by an alternative procedure with the same conclusion. The analysis includes the consideration of effects of the continuum of the energy spectrum of each of the two delta-function potentials and of the effects of these parts of the spectra on the transition probability. These effects are found small in the case considered. The exact solutions are put into a form especially suitable for the comparisons made. The modified energy matrix method is made use of to estimate the effect of the finiteness of the range of force and to analyze the location in space of contributions to the transfer amplitude. (Author)

AD-627 781 Fld. 20/8
INSTITUTE OF THEORETICAL PHYSICS STANFORD UNIV CALIF
EXCHANGE ELECTRICAL MOMENTS FOR NUCLEAR BETA AND GAMMA TRANSITIONS,
by Yasunori Fujii, and Jun-Ichi Fujita. 1 Jun 65, 6p. Contract AF49 (628)-1389
AFOSR 65-2696

Unclassified report

Availability: Published in The Physical Review v140 n2B pB239-44 Oct 25 1965. Copies to DDC users only.

Descriptors: (*Nuclear electric moments, Nuclear reactions), (*Nuclear reactions, Electric currents), Beta particle rstions, Photonuclear reactions, N-body problem, Bosons

The relative importance of exchange electric currents in nuclear beta and gamma transitions is estimated by using their relation to the Van Vleck potential and to the sum rule for nuclear photoabsorption cross section. Though the exchange electric currents are not experimentally observable because of the Siegert theorem, the estimates give us an idea of the difference between a free nucleon and a nucleon inside a nucleus. It is found that the magnitude of the exchange electric current relative to the convection current is more than 40% at the Fermi surface. (Author)

AD-627 852 Fld. 20/8
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
BETA-DECAY COUPLING CONSTANTS,
by Y. S. Kim. 24 Aug 64, 11p. Contract AF-AFOSR-500-64
AFOSR 65-2783

Unclassified report

Availability: Published in Il Nuovo Cimento (ser10) v36 p523-32 16 Mar 1965. Copies to DDC users only.

Descriptors: (*Beta decay, Momentum), Vector analysis, Scattering, Approximation (Mathematics)

Dispersion relations are introduced which give the same asymptotic value for the vector and axial-vector form factors in the limit of high momentum transfer. The ratio gA/gV is related to the behavior of the vector form factor in the region of low momentum transfer. The numerical value gA/gV approx. = -1.2 is obtained from the experimental curves for the electromagnetic form factors. (Author)

AD-627 982 Fld. 20/8
CORNELL UNIV ITHACA N Y DEPT OF CHEMISTRY
DERIVATION OF KINETIC EQUATIONS FOR SLOW-NEUTRON SCATTERING,
by J. M. J. Van Leeuwen, and Sidney Yip. 4 Dec 64, 14p. Contract AT (30-1)-3326 ,AF-AFOSR-324-63
AFOSR 65-2956

Unclassified report

Availability: Published in The Physical Review v139 n4A pA1138-51 16 Aug 1965. Copies to DDC users only.

Descriptors: (*Neutron scattering, Equations of motion), (*Thermal neutrons, Neutron scattering), Neutron transport theory, N-body problem, Series, Statistical functions, Statistical mechanics

It is shown that for moderately dense classical gases Van Hove's correlation functions can be calculated from kinetic equations. The kinetic equations are derived from the cluster expansion of a one-particle distribution function which describes the propagation of a density-momentum impulse. For times short compared with the time between collisions, the density series can be used directly. But for longer times a different treatment is necessary because of the increasing importance of multiple collisions. Considering only the dominant terms, the series is shown to be the iterated solution of an integral equation. In lowest order, this equation has the form of a linearized Boltzmann equation in which the collision kernel is nonlocal because of the finite extent of the particles, and is non-Markoffian if the duration of a collision is finite. The present approach permits a systematic treatment of coherent as well as incoherent scattering. It is demonstrated that the appropriate equations for studying the two kinds of scattering are, respectively, the linearized Boltzmann equation and the neutron transport equation. The effects of statistical correlation are introduced approximately in the kinetic equations in lowest order. (Author)

AD-628 028 Fld. 20/8, 20/10
CFSTI Prices: HC $1.00 MF $0.50
BRUSSELS UNIV (BELGIUM)
FINAL SCIENTIFIC REPORT,
by R. Brout, and F. Englert. 1965, 17p. Contract AF-EOAR-63-51
AFOSR 66-0158

Unclassified report

Descriptors: (*Elementary particles, Field theory), (*N-body problem, Phase studies), Relativity theory, Quantum mechanics

Current research in the marcy-body problem, field theory, and particle physics is discussed.

AD-627 281 **See Fld. 20/12**

AD-627 302 **See Fld. 7/4**

AD-627 577 **See Fld. 20/12**

AD-627 623 **See Fld. 12/1**

AD-627 723 **See Fld. 20/10**

AD-628 016 **See Fld. 7/4**

20/9. PLASMA PHYSICS

AD-627 267 Fld. 20/9
CFSTI Prices: HC $5.00 MF $1.00
NORTHWESTERN UNIV EVANSTON ILL GAS DYNAMICS LAB
MICROWAVE DETERMINATION OF ANISOTROPIC PLASMA ELECTRON DENSITY PROFILES,
by R. C. Warder, and D. L. Hector. Aug 65, 152p. Rept. no. NU-GDL-B-3-65
Contract AF-AFOSR-62-307 ,AF-AFOSR-329-63 Proj. AF-9752 Task 975201
AFOSR 65-2215

Unclassified report

Descriptors: (*Plasma medium, Electron density), Magnetic fields, Microwaves, Probes (Electromagnetic), Propagation, Measurement, Tables, Magneto-optic effect

A method for the determination of the spatial electron density distribution in plasmas subjected to external magnetic fields is presented. The method involves the measurement of the Faraday rotation angle as a function of the external magnetic field strength. Results of calculations of normalized Faraday rotation angle versus normalized electron cyclotron frequency for various assumed electron density distributions are given. (Author)

AD-627 477 Fld. 20/9
MARYLAND UNIV COLLEGE PARK INST FOR FLUID DYNAMICS AND APPLIED MATHEMATICS
NONLINEAR MODE INTERACTIONS IN UNIVERSAL PLASMA INSTABILITIES,
by Herbert Lashinsky. 24 May 65, 3p. Contract AF-AFOSR-141-65
AFOSR 65-2054

Unclassified report

See also AD-625 033.

Availability: Published in Physical Review Letters v14 n26 p1064-6 28 June 1965. Copies to DDC users only.

Descriptors: (*Plasma oscillations, Nonlinear systems), (*Plasma physics, Stability), Dynamics, Experimental data

AD-627 480 Fld. 20/9, 20/14, 20/3
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
INTERFEROMETRIC MEASUREMENT OF MICROWAVE HELICON DISPERSION AND THE HOLE DAMPING EFFECT IN INTRINSIC INSB,
by Jacek K. Furdyna. 2 Mar 65, 6p. Contract AF 49 (638)-1468 Proj. AF-9764 Task 976400
AFOSR 65-1982

Unclassified report

Availability: Published in Physical Review Letters v14 n16 p635-8 19 Apr 1965. Copies to DDC users only.

Descriptors: (*Plasma medium, Semiconductors), (*Microwaves, Scattering), Carriers (Semiconductors), Plasma oscillations, Damping, Indium alloys, Antimony alloys, Interferometers

Helicon wave propagation is investigated in intrinsic InSb at 35 Gc/sec in the temperature range from 200 to 400K in magnetic fields up to 100 kgauss. Well-defined Rayleigh-type interference patterns indicate that the hold contribution to the helicon dispersion is negligible in practically the entire available field region, and in this sense the role of the slow carriers is similar to that of the fixed positive ions. However, even at moderate fields, the hold plasma provides the dominant damping mechanism of the helicons. Results, obtained by using the classical helicon model, agree moderately with the known dc mobilities. The inadequacy of the model in the proximity of the quantum regime is a likely cause for the discrepancy. Rayleigh patterns are also obtained by varying the concentration via temperature at fixed field, with more accurate results. (Author)

AD-627 614 Fld. 20/9
CFSTI Prices: HC $1.00 MF $0.50
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF PHYSICS
RECOMBINATION RATES FOR HE (++) IONS: A REPLY TO 'COMMENTS ON DEVIATIONS FROM IONIZATION EQUILIBRIUM IN PLASMAS GENERATED BY ELECTRIC SHOCK TUBES'.
Technical rept.,
by Donald E. Kerr, and Ralph C. Isler. Jan 66, 23p. Rept. no. TR-2
Contract Nonr-4010 (10) ,DA-28-043-AMC-00099 (E) Proj. NR-012 304

Unclassified report

Descriptors: (*Helium, Recombination reactions), (*Plasma medium, Helium), Shock tubes, Ionization, Chemical equilibrium, Reviews

Criticisms have been made by H. R. Griem, A. C. Kolb, and E. A. McLean of earlier work on deviations from ionization equilibrium in helium plasmas generated by electric shock tubes. The report presents further experimental data and calculations, including some of characteristic recombination times. They support original conclusions, and show that the suggestions of Griem, et al, concerning possible misinterpretation of spectroscopic data, are not tenable. (Author)

AD-627 681 Fld. 20/9
CFSTI Prices: HC $2.00 MF $0.50
CALIFORNIA INST OF TECH PASADENA
CYCLOTRON ECHO PHENOMENA.
Technical rept.,
by Roy W. Gould. Dec 65, 34p. Rept. no. TR-28
Contract Nonr-220 (50)

Unclassified report

Pub. in Bull. A. P. S. v10 p1191 1965.

Descriptors: (*Cyclotron resonance phenomena, Plasma medium), Magnetohydrodynamics, Electrons, Equations of motion, Cyclotron waves, Electron spin resonance, Quantum statistics

Experimental observations and theories of pulse stimulated radiation phenomena in plasmas are reviewed. The motions of an ensemble of non-interacting electrons in a magnetic field is considered and it is shown that cyclotron echoes in plasmas can arise out of various types of nonlinearities: (a) energy dependent electron cyclotron frequency, (b) energy dependent electron collision frequency, (c) energy dependent driving force. The similarities and differences with spin and photon echoes is discussed, and several new related phenomena are also described. (Author)

AD-627 742 Fld. 20/9, 20/3
MARYLAND UNIV COLLEGE PARK INST FOR FLUID DYNAMICS AND APPLIED MATHEMATICS
NOZZLE FLOW OF A FULLY IONIZED PLASMA BASED ON TWO FLUID THEORY,

by S. I. Pai, and C. K. Tsao. 27 Oct 64, 14p.
Contract AF-AFOSR-141-64 Proj. AF-9783
Task 978302
AFOSR 65-2055

Unclassified report

Availability: Published in Journal of Applied Mathematics and Physics (ZAMP) v16 Fasc. 3 p360-70 1965. Copies to DDC users only.

Descriptors: (*Plasma physics, One-dimensional flow), (*Magnetohydrodynamics, Theory), Supersonic nozzles, Fluid flow, Numerical analysis, Dynamics

Two fluid theory is used to analyze the 1-dimensional steady channel flow of a fully ionized plasma, and results are compared with those of single fluid theory. At a low rate of discharge, the two theories give very similar results, however the two fluid theory gives a more detailed picture of the flow-field of the plasma. It shows that the temperature of electrons is much larger than that of ions at high discharge rates. A special numerical example is presented of subsonic nozzle flow of a fully ionized gas. It is found that at the critical point where the local mach number of plasma reaches unity, the ion temperature and ion pressure both drop to zero, and ion velocity reaches its terminal value for a given initial pressure. (Author)

AD-627 809 Fld. 20/9
ILLINOIS UNIV URBANA GASEOUS ELECTRONICS LAB
A MICROWAVE METHOD FOR PLASMA INSTABILITY STUDIES,
by B. E. Cherrington, and L. Goldstein. 25 Jun 64, 22p. Rept. no. Scientific-3
Contract AF19 (628)-2391 Proj. AF-8605 Task 860502
AFCRL 65-741

Unclassified report

Availability: Published in Plasma Physics (Journal of Nuclear Energy Pt C) v7 p263-75 1965. Copies to DDC users only.

Descriptors: (*Plasma medium, Stability), (*Probes (Electromagnetic), Plasma medium), Microwave equipment, Plasma oscillations, Magnetic pinch, Microwaves

A brief description is given of the use of low-power level microwave propagation techniques for the study of helical instabilities in magnetoplasmas. It is shown that this technique is well suited to the investigation of time varying plasma structures and instabilities in general. Rotational frequencies of various modes of the helical instability, determined as a function of the gas pressure and of the confining magnetic field intensities, are illustrated and are compared with theory. This method also reveals the conditions for the existence of configurations in decaying (afterglow) and r.f.-maintained magnetoplasmas which are similar to those found in d.c.-maintained magnetoplasmas. (Author)

AD-627 885 Fld. 20/9
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
ASYMPTOTIC INTEGRATION OF THE EQUATION GOVERNING MAGNETOHYDRODYNAMIC FLOW WITH ALIGNED VELOCITY AND MAGNETIC FIELDS,
by S. A. Berger. Jan 66, 25p. Rept. no. RM-4788-ARPA
Contract SD-79, ARPA Order-189-61

Unclassified report

Descriptors: (*Magnetohydrodynamics, Equations of motion), (*Integration, Equations of motion), Magnetic fields, Velocity, Asymptotic series, Fluid flow

The planar flow of an infinitely conducting fluid moving in such a way that the velocity and magnetic fields are always aligned can be analyzed by means of the hodograph technique. The partial differential equation for the stream function in hodograph variables is linear and may be solved by separation of variables. One of the two resulting ordinary differential equations is immediately solvable in terms of trigonometric functions; the other is, for general values of the adiabatic exponent, a secondorder linear differential equation with very complicated variable coefficients. The asymptotic behavior of the solutions of this latter equation for large values of the separation constant is obtained. The asymptotic expansion of the derivative of the solution is also given explicitly. The results reduce to the well-known asymptotic forms of the Chaplygin function and its derivative when the magnetic field is set equal to zero. (Author)

AD-627 900 Fld. 20/9
CFSTI Prices: HC $1.00 MF $0.50
GRADUATE AERONAUTICAL LABS CALIF INST OF TECH PASADENA
THE ELECTRICAL CONDUCTIVITY OF SEEDED GASES.
Final rept., pt. 2,
by Tse-Fou Zien. 1965, 25p. Contract AF498 (638)-1348 Proj. AF-4661 Task 4661246
AFOSR 65-2018

Unclassified report

Descriptors: (*Plasma medium, Electrical conductance), (*Electrical conductance, Plasma medium), Magnetohydrodynamics, Electrons, Transport properties, Ionization, Electric fields, Electric propulsion, Magnetohydrodynamic generators

A crude but simple method of evaluating the electrical conductivity of seeded-plasma, applicable to both equilibrium and non-equilibrium cases is presented. A simplified method, that of the mean-free-path, is used in which the force acting on an electron due to the externally applied electric field is considered the only force that causes collision between the electron and the neutral atom or molecule. This method does not consider the effect of the ions; however, in the ordinary practice of seeding, the seeding fraction is usually less than 1% and the temperature rarely exceeds 3000K. Under these circumstances the effect of ions is believed to be negligible. Satisfactory results are obtained in the temperature range of practical interest, but serious error may occur when applying this method to higher temperature regions where the ionization becomes so significant that Coulomb interaction is important. (Author)

AD-627 901 Fld. 20/9
CFSTI Prices: HC $1.00 MF $0.50
GRADUATE AERONAUTICAL LABS CALIF INST OF TECH PASADENA
BIBLIOGRAPHY ON MHD CHANNEL FLOW.
Final rept., pt. 3,
by K. Harstad. 1965, 18p. Contract AF49 (638)-1348 Proj. AF-4661 Task 4661246
AFOSR 65-2019

Unclassified report

Descriptors: (*Magnetohydrodynamics, Bibliographies), Fluid flow, Magnetic fields, Magnetohydrodynamic generators

A bibliography of one hundred and seventy references is presented on magnetohydrodynamic channel flow. The references are arranged alphabetically by author, generally with brief annotations. (Author)

AD-627 902 Fld. 20/9
CFSTI Prices: HC $1.00 MF $0.50
GRADUATE AERONAUTICAL LABS CALIF INST OF TECH PASADENA
SOME PROBLEMS IN MHD PIPE FLOW.
Final rept., pt. 4,
by J. D. Cole, and P. Caseau. 1965, 24p. Contract AF49 (638)-1348 Proj. AF-4661 Task 4661246
AFOSR 65-2020

Unclassified report

Descriptors: (*Magnetohydrodynamics, Pipes), Incompressible flow, Boundary layer, Viscosity, Electrical conductance

The methods of boundary layer theory are systematically applied in order to obtain information about the distribution of flow in a cross section. Although the work is based on incompressible flow it is believed that the essential differences found between insulator and electrode boundarylayers is a general feature of all magnetohydrodynamic channel flows. (Author)

AD-627 919 Fld. 20/9, 20/4
CFSTI Prices: HC $3.00 MF $0.75
NAVAL WEAPONS LAB DAHLGREN VA
ON MAGNETOHYDRODYNAMICS OF ROTATING FLUIDS,
by Ernst W. Schwiderski, and Hans J. Lugt. Dec 65, 72p. Rept. no. NWL-1962
Task R360FR103/2101/R0110101

Unclassified report

Descriptors: (*Magnetohydrodynamics, Vortices), (*Vortices, Magnetohydrodynamics), Magnetohydrodynamic generators, Boundary layer, Magnetic properties, Reynolds number, Wake, Partial differential equations

The influence of rather general electromagnetic forces acting upon steady rotating motions of conducting viscous incompressible fluids over a rotating disk is investigated by means of adjustable local boundary layer approximations of first order. Numerical results for the most important motions of von Karman and Bodewadt are displayed and discussed in full detail. The hypothesis of small variations of the imposed magnetic field assumed in other investigations is found to be justified provided the corresponding Hartmann number and magnetic Reynolds number are of sufficiently small magnitude. Considerable distortions of the rotating motions result from strong electromagnetic forces. When the strength of the imposed electromagnetic forces is increased, the secondary motions may change their stagnation character to wake character, and vice versa. In addition to critical Reynolds numbers critical Hartmann numbers and magnetic Reynolds numbers are shown to exist beyond which no simple boundary-layer-type motions are possible. The interpretation of the spacial instabilities of wake-type flows as a separation phenomenon is supported by the 'tea-cup' experiment photographed. (Author)

AD-627 922 Fld. 20/9
CFSTI Prices: HC $2.00 MF $0.50
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH GEO-ASTRO PHYSICS LAB
FIELD-ALIGNED FLOW OF A CONDUCTING FLUID PAST A SOURCE OF MAGNETISM,
by D. F. Winter, and R. A. Gerwin. Oct 65, 33p. Rept. no. D1-82-0469

Unclassified report

Also available from the authors.

Descriptors: (*Magnetohydrodynamics, Incompressible flow), Magnetic fields, Velocity, Viscosity, Field theory, Plasma medium, Continuum mechanics, Wake

A prescribed source of magnetism moves at constant speed through a viscous conducting incompressible fluid with an aligned uniform magnetic field. The velocity and magnetic fields induced at a distance from the source are calculated. The induced fields are also calculated for the case in which the applied field is absent. Although no special symmetry or alignment is assumed, the source is 'ideal' in the sense that enclosures (wires or magnets) are infinitesimal in at least two dimensions. Dynamical interactions will occur in a viscous fluid and their effect in the far field is estimated. The usual wakes are present which trail or lead the source depending upon the sign of (1 - A-sq), where A is the ratio of the source speed to the Alfven speed in the undisturbed fluid. Outside the wake the total perturbation magnetic field due to

the source is the static field plus a monopole field, divided by (1 - A-sq). An estimate is made of the rate at which energy is dissipated as a consequence of viscous interactions and ohmic heating throughout the fluid, outside the immediate vicinity of the source. (Author)

AD-627 935 Fld. 20/9
CFSTI Prices: HC $3.00 MF $0.75
MARYLAND UNIV COLLEGE PARK
A CRITICAL SURVEY OF MAGNETOFLUID DYNAMICS. PART III. QUASI-ONE DIMENSIONAL ANALYSIS OF MAGNETOGAS DYNAMICS,
by Shih-I Pai. Dec 65, 66p. Contract AF33 (657)-7805 Proj. AF-7063
ARL 63-175-pt-3

Unclassified report

See also AD-603 386 and AD-423 893.

Descriptors: (*Magnetohydrodynamics, One-dimensional flow), Fluid flow, Electromagnetic fields, Viscosity, Nonequilibrium flow, Pipes

A critical survey is presented of the flow of an ionized gas in a channel under the influence of transverse electro-magnetic fields. First, the exact quasi-one dimensional equations of magneto-gas dynamics are derived. The importance of the various covariance coefficients is pointed out. In the literature, only the cases with covariance coefficients of unity have been reported. A survey of these cases has been made which includes (1) inviscid steady flow, (2) steady flow of viscous and heat-conducting fluid and (3) unsteady flow. Finally, we summarize our present knowledge of quasione dimensional flow of magneto-gas dynamics and make some recommendations for future research. (Author)

AD-627 939 Fld. 20/9
BRUSSELS UNIV (BELGIUM)
KINETIC EQUATION FOR AN INHOMOGENEOUS PLASMA FAR FROM EQUILIBRIUM,
by R. Balescu, and A. Kuszell. 11 Feb 64, 10p.
Contract AF-EOAR-62-16
AFOSR 65-2778

Unclassified report

Availability: Published in Journal of Mathematical Physics, v5 n8 p1140-9 Aug 1964. Copies to DDC users only.

Descriptors: (*Plasma medium, Kinetic theory), (*Statistical mechanics, Charged particles), Equations of motion, Plasma oscillations, Integral equations

A kinetic equation for a nonuniform plasma is derived from the Liouville equation by a general diagram technique. It describes the evolution of a small spatial inhomogeneity in a plasma whose velocity distribution is far from equilibrium (and hence time-dependent). The equation is valid for short and long times, within the ring approximation. Its explicit form is obtained by the exact closed solution of a singular integral equation. The kinetic equation is non-Markoffian and, contrary to the corresponding homogeneous equation, keeps a trace of this character even in the limit of long times. Only when the velocity distribution and the two-body correlation function reach thermal equilibrium does the equation reduce to a Markoffian limit. The latter is identical with the kinetic equation derived earlier by Guernsey. The treatment of unstable inhomogeneous plasmas is briefly indicated. (Author)

AD-627 958 Fld. 20/9
STD RESEARCH CORP PASADENA CALIF
ON THE FUNCTIONAL DEPENDENCE OF TOWNSEND'S FIRST IONIZATION COEFFICIENT,
by A. N. Kontaratos. 16 Jul 64, 6p. Contract AF49 (638)-1445
AFOSR 65-2503

Unclassified report

Availability: Published in Appl. sci. Res. Sec. B v12 p27-32 1964. Copies to DDC users only.

Descriptors: (*Gas ionization, Numerical analysis), Gas discharges, Electric fields, Pressure, Air, Space charges, Electrons

An expression is derived of Townsend's ionization coefficient in terms of electric field and pressure, which fits the experimental data for air in the range E/p = 10 to 1000 Volts/cm x mm Hg. (Author)

AD-627 988 Fld. 20/9
CFSTI Prices: HC $2.00 MF $0.50
ARO INC TULLAHOMA TENN
IONIZATION AND RECOMBINATION IN ALKALI-SEEDED COLLISION-DOMINATED PLASMAS.
Technical rept.,
by B. P. Curry. Feb 66, 50p. Contract AF40 (600)-1200 Proj. ARO-PT8002
AEDC TR-65-260

Unclassified report

Descriptors: (*Plasma medium, Alkali metals), (*Ionization, Plasma medium), (*Recombination reactions, Plasma medium), Magnetohydrodynamics, Electron transitions, Atomic energy levels, Quantum mechanics

At electron densities greater than 10 to the 12th power/ cc, ionization and recombination proceed predominantly by sequential transitions between adjacent energy levels induced by collisions with free electrons. Similar models for this process have been developed by various investigators. This report develops closed-form expressions for ionization and recombination of effective one-electron atoms by modifying the Byron model and determining analytically the critical energy level in equilibrium with the free electrons, using a simplified quantum mechanical model of the alkali atoms. The reaction rate coefficients calculated from these expressions agree satisfactorily with available experimental data and with numerical calculations of other investigators. (Author)

AD-628 004 Fld. 20/9
CFSTI Prices: HC $2.00 MF $0.50
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
CONSOLIDATED QUARTERLY PROGRESS REPORT ON PLASMA RESEARCH.
Quarterly progress rept. no. 1, 1 Jan-31 Mar 65. Mar 65, 42p. Rept. no. 112
Contract AF33 (615)-1078 ,AF-AFOSR-139-64

AFOSR 65-230:

Unclassified report

Descriptors: (*Plasma physics, Scientific research), Lasers, Probes (Electromagnetic), Synchrotrons, Cyclotrons, Plasma oscillations, Stability, Cyclotron waves, Damping, Ion sources

Contents: BME-II; Plasma diagnostics with a laser; Synchrotron radiation measurements; weakly stabilized mirror machine of the mirror-quadrupole type; Electron cyclotron heating; Plasma instability experiment; Stability of hollow plasmas; Computer model for nonlinear investigation of plasma interchange instability; Damping and instabilities of cyclotron waves in a plasma; Automatic data processing; Instabilities of centrifugal electrostatic focused flow; RF ion source for an ion energy analyzer; Electron cyclotron heating in magnetic mirror machines.

AD-628 018 Fld. 20/9
CFSTI Prices: HC $2.00 MF $0.50
GENERAL ATOMIC SAN DIEGO CALIF
NON-LINEAR THEORY OF PLASMA DYNAMICS.
Final technical rept. 1 Feb 64-31 Jan 65,
by R. E. Aamodt. 1 Mar 65, 38p. Rept. no. GA-6179
Contract AF49 (638)-1356 Proj. GA-403

Unclassified report

Descriptors: (*Plasma physics, Nonlinear systems), Magnetohydrodynamics, Plasma oscillations

The effects of the non-linear process of resonant wave-wave scattering for unstable modes in a homogeneous plasma system with a constan t external magnetic field are evaluated. It is shown that this particular non-linear mechanism may provide a partial explanation of some existing experimental results, and in addition, provides an experiment to verify the non-linear theory. (Author)

AD-628 024 Fld. 20/9, 10/2
CFSTI Prices: HC $1.00 MF $0.50
UNITED AIRCRAFT CORP EAST HARTFORD CONN RESEARCH LABS
EFFECTS OF INERT GAS OVERPRESSURE ON ARC CHARACTERISTICS,
by R. H. Bullis, W. J. Wiegand, and D. W. Bell. 1965, 9p. Contract AF49 (638)-1221
AFOSR 65-2500

Unclassified report

Prepared for presentation at the Annual Conference on Physical Electronics (25th), Massachusetts Inst. of Tech., Cambridge, 24-26 Mar 1965.

Descriptors: (*Helium group gases, Thermionic converters), (*Gas ionization, Argon), (*Thermionic converters, Gas ionization), Cesium, Plasma physics, Electrostatics, Probes, Energy conversion

To determine the effect of the presence of an inert gas on the properties of the non-equilibrium cesium plasma which exists in the interelectrode space of an arc-mode thermionic converter, detailed electrostatic probe measurements have been made of electron temperature, electron number density, and the plasma potential over a wide range of inert gas pressures. By employing electrostatic probe techniques to measure the properties of the non-equilibrium cesium plasma, direct assessment has been made of the effects of an overpressure of inert gas on the plasma properties without having to include extraneous effects such as changes in the work functions of the emitter and collector produced by the interaction of the inert gas with these surfaces. In addition, spectroscopic measurements have been made to determine the behavior of the atomic and molecular excited state populations with changes in inert gas pressure, converter output and maximum electron density in the neutralization plasma. The range of inert gas pressure over which volume ionization processes can be sustained in the non-equilibrium neutralization plasma in the converter with argon used as the inert gas has been determined from these measurements. (Author)

AD-628 029 Fld. 20/9, 20/3
CFSTI Prices: HC $5.00 MF $1.00
STD RESEARCH CORP PASADENA CALIF
OHM'S LAW IN MULTICOMPONENT NON-ISOTHERMAL PLASMAS WITH TEMPERATURE AND PRESSURE GRADIENTS.
Final rept.,
by Sterge T. Demetriades, and George S. Argyropoulos. Sep 65, 91p. Rept. no. STD-65-12
Contract AF49 (638)-1445 ,AF49 (638)-1594
Proj. AF-9752 Task 975201
AFOSR 66-0004

Unclassified report

Descriptors: (*Plasma medium, Electrical properties), (*Electrical conductance, Plasma medium), Transport properties, Thermal conductivity, Resistance (Electrical), Electric currents, Voltage, Electric fields, Magnetic fields

A closed set of transport equations with collision terms that have been evaluated by the 13-moment

approximation is used, under well-defined assumptions, to derive a generalized Ohm's Law in multicomponent non -isothermal plasmas as a function of the electric and magnetic fields and the temperature and pressure gradients. The nine coefficients defining this dependence are expressed in matrix form in terms of component properties for any number N of components in the plasma, each component having its own temperature. The matrix expressions are evaluated in detail for four- and five-component plasmas (N=4,5); this allows the investigation of effects that cannot be studied with the available three-fluid expressions.

AD-627 363 See Fld. 20/5

AD-627 530 See Fld. 9/1

AD-627 658 See Fld. 10/1

AD-627 673 See Fld. 9/5

AD-627 688 See Fld. 20/4

AD-627 796 See Fld. 22/3

AD-628 015 See Fld. 20/13

AD-628 025 See Fld. 9/3

AD-628 034 See Fld. 19/1

20/10. QUANTUM THEORY

AD-627 396L Fld. 20/10
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
A PROBLEM ON SUMMATION OVER HISTORIES IN QUANTUM MECHANICS,
by A. M. Arthurs. 17 Jan 66, 16p. Rept. no. WIS-TCI-144
Contract DA-11-033-ORD-2059 ,NsG-275-62

Unclassified report

Prepared in cooperation with Wisconsin Univ., Madison. Theoretical Chemistry Inst.

Descriptors: (*Quantum mechanics, Integrals), Operators (Mathematics), Series

AD-627 723 Fld. 20/10, 20/8
OSLO UNIV (NORWAY) INST FOR THEORETICAL PHYSICS
COVARIANT AND HERMITIAN SEMI-CLASSICAL LIMIT OF QUANTUM DYNAMICAL EQUATIONS FOR SPIN 1/2 PARTICLES,
by Marius Kolsrud. Mar 65, 31p. Rept. no. 27
Contract AF-EOAR-32-64 Proj. AF-9760 Task 976001
AFOSR 65-2755

Unclassified report

Availability: Published in Physica Matematica p4-30 Mar 1965. Copies to DDC users only.

Descriptors: (*Quantum mechanics, Equations of motion), (*Elementary particles, Quantum mechanics), Tensor analysis, Nuclear skins, Transformations (Mathematics), Dynamics

The Dirac equation with a Pauli term is transformed to a covariant and Hermitian two-component form to first order in h. The Bargmann-Michel-Telegdi equations are deduced as equations of motion for spin-operators. Corresponding operators in the Dirac and semi-classical picture are discussed. (Author)

AD-627 843 Fld. 20/10, 7/4, 6/15
CFSTI Prices: HC $2.00 MF $0.50
CHEMICAL RESEARCH AND DEVELOPMENT LABS EDGEWOOD ARSENAL MD
QUANTUM-MECHANICAL CALCULATIONS. I. THE MODERN HUCKEL CALCULATION.
Technical rept. Feb-Sep 64,
by P. Gary Mennitt, and Wally P. Giordano. Aug 65, 31p. Rept. no. CRDLR-3297
Proj. DA-1C622401A097

Unclassified report

Descriptors: (*Quantum mechanics, Molecular orbitals), (*Molecular orbitals, Combinatorial analysis), Pharmacology, Biochemistry, Chemical bonds, Valence, Perturbation theory, Molecular energy levels, Programming (Computers)

The Huckel-type quantum-mechanical calculation of molecular electronic systems was introduced as a tool in chemical pharmacology. Computer programs were developed at CRDL for molecular-orbital calculations. The highlights of the molecular-orbital theory (its mathematical, chemical, and physical foundation) are developed, followed by a detailed explanation of the use of the programs. Applications of the results to the analysis of chemical (chemical pharmacological) activity are introduced. The molecular-orbital procedure is illustrated for the important molecule 2-PAM (2-pyridine aldoxime methiodide). (Author)

AD-627 390 See Fld. 20/12

AD-627 468 See Fld. 20/2

AD-627 488 See Fld. 9/4

AD-627 724 See Fld. 20/3

AD-627 725 See Fld. 20/13

AD-627 730 See Fld. 20/13

AD-627 731 See Fld. 20/13

AD-627 773 See Fld. 20/8

AD-627 995 See Fld. 20/6

AD-628 028 See Fld. 20/8

20/11. SOLID MECHANICS

AD-627 464 Fld. 20/11
UNIVERSITY COLL CORK (EIRE)
NON-LINEAR BENDING OF AN ANNULAR PLATE BY TRANSVERSE EDGE FORCES,
by V. G. Hart, and D. J. Evans. 30 Apr 64, 30p.
Contract AF-EOAR-61-4 ,AF-EOAR-62-43
AFOSR 65-2043

Unclassified report

Availability: Published in Journal of Mathematics and Physics v43 n4 p275-303 Dec 1964. Copies to DDC users only.

Descriptors: (*Force (Mechanics), Bending), (*Bending, Sheets), Elasticity, Numerical analysis, Nonlinear differential equations, Asymptotic series

AD-627 467 Fld. 20/11, 14/2
CFSTI Prices: HC $2.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
A MECHANICAL SHOCK PULSE SURVEY.
Technical rept.,
by Francesco Palmisano, and Louis Leo Kaplan. Dec 65, 44p. Rept. no. ECOM-2647
Proj. DA-1P6-22001-A-055 Task 1P6-22001-A-055-01

Unclassified report

Descriptors: (*Shock waves, Test equipment), (*Test equipment, Shock waves), Analysis, Graphics

A mechanical shock pulse survey of the shock pulse shapes produced by eight mechanical shock machines used in the evaluation of electronic piece parts is discussed. The shock machines include the general types of free-fall, pendulum, and cam-activated. The shock pulses range in nominal time duration of the major positive pulse from 0.60 to 32.00 milliseconds and peak amplitudes from 58 to 1500 gravitational units. Details of the recording and instrumentation techniques employed to obtain survey data are presented. Instrumentation calibration and problems of undershoot are also discussed, as is the reduction of the raw data from their original collected form to a form suitable for analysis and storage. The methods of analysis, quantitative and qualitative, of the shock pulse curves obtained from the eight mechanical shock machines surveyed were to first determine shock pulse curve's amplitude-frequency spectrum by use of a special-purpose analog computer which is designed specifically to compute Fourier integrals. The frequency spectrum is then converted to a Bode Diagram from which a graphical comparison of the shock pulse is made. (Author)

AD-627 553 Fld. 20/11, 13/13
LOUVAIN UNIV (BELGIUM) INSTITUT DE MECANIQUE APPLIQUEE
ON THE SINGULAR CONFIGURATIONS OF STATICALLY DETERMINATE STRUCTURES.
Revised ed.,
by F. Buckens. 3 Oct 64, 15p. Contract AF-EOAR-62-107
AFOSR 65-2427

Unclassified report

Revision of manuscript submitted 10 Jan 64.

Availability: Published in International Journal of Mechanical Sciences v7 p301-14 1965. Copies to DDC users only.

Descriptors: (*Structures, Mechanics), (*Mechanics, Structures), Determination, Configuration, Belgium

This paper shows how singular configurations of statically determinate plane structures can be determined. When the structure is a linkage, such configurations entail degrees of freedom 'in the small', which make it act as a mechanism for infinitesimal motions. Their practical importance comes from the fact that large constraints are induced in the members of the linkage when external forces act upon such structures, if their configuration is very close to a singular one. Different degrees and orders of singularity are considered, which respectively correspond to the rank and stationarity of a given determinant, and a few examples are given. (Author)

AD-627 642 Fld. 20/11
CFSTI Prices: HC $1.00 MF $0.50
COLUMBIA UNIV NEW YORK DEPT OF CIVIL ENGINEERING AND ENGINEERING MECHANICS
COMPARISON OF COMPLEX MODULI OBTAINED FROM FORCED AND FREE DAMPED OSCILLATIONS.
Technical rept.,
by R. A. Heller, and C. J. Nederveen. Nov 65, 21p. Rept. no. TR-32
Contract Nonr-266 (78) Proj. NR-064-446

Unclassified report

Descriptors: (*Oscillation, Damping), Vibration, Stresses, Equations, Creep, Deformation, Mathematical models

An analysis of a generalized Maxwell model, representing a viscoelastic solid under conditions of forced and free oscillations shows that the complex modulus computed from the two types of motion are not identical but the approximation provided by a free vibration experiment is reliable when tan delta is less than 0.6. The free vibration experiment over estimates damping and under estimates the modulus. (Author)

AD-627 652 Fld. 20/11, 11/6
CFSTI Prices: HC $3.00 MF $0.75
NAVAL ORDNANCE LAB WHITE OAK MD
AN INVESTIGATION OF THE DYNAMIC DEFORMATION OF SMALL COPPER BALLS,

by Houston M. Cole. 27 Dec 65, 61p. Rept. no. NOLTR-65-189
Proj. NOL-701/DASA

Unclassified report

Descriptors: (*Copper, Deformation), Spheres, Crusher gages, Force (Mechanics), Velocity, Loading (Mechanics), Explosions, Damage, Pressure

Annealed copper balls of the type used in tarage and crusher gages were compressed at compression speeds from 0.01 in/min to about 400 ft/sec. It was found that the force-deformation curve at any two velocities of compression are related as the ratio of the mean velocities of compression. The force-deformation curve roughly follows that of a spring-mass system; however, a more accurate method is described which gives pressures from large explosions which are much closer to actual piezoelectric gage measurements than found by previous calculations. (Author)

AD-627 657 Fld. 20/11, 20/1
CFSTI Prices: HC $1.00 MF $0.50
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF PHYSICS
FINAL REPORT,
by E. J. Skudrzyk. Jan 65, 15p. Contract AF-AFOSR-43-63
AFOSR 65-0243

Unclassified report

Descriptors: (*Mechanical properties, Solids), Acoustic properties, Mechanical waves, Elasticity, Piezoelectric effect, Ultrasonic radiation, Attenuation, Vibration, Loading (Mechanics), Shear stresses

Contents: Measurements at very low frequencies; Measurements of the elastic modulus and the loss factor of small specimen such as strips and foils; Measurements of the bulk modulus of a small sample; Measurements at 500 kcs to 5 mc by loading a quartz crystal; Ultrasonic attenuation and wave propagation in solids; Attenuation in aluminum and bell metal at frequencies between 100 cps and 10 kc.

AD-627 672 Fld. 20/11
CFSTI Prices: HC $3.00 MF $0.75
RENSSELAER POLYTECHNIC INST TROY N Y DEPT OF MECHANICS
SOLUTION OF THE RING FOR ELASTIC MATERIALS EXHIBITING COUPLE-STRESSES.
Rept. for 1 Nov 64-30 Sep 65,
by R. F. Maye, and F. F. Ling. Dec 65, 86p.
Contract AF33 (657)-10058 Proj. AF-7342 Task 734204
AFML TR-65-372

Unclassified report

Descriptors: (*Elasticity, Stresses), (*Rings, Elasticity), Tensor analysis, Series, Integral transforms, Equations of motions, Loading (Mechanics), Disks

Interest in the couple-stress theory of elasticity which was introduced by E. and F. Cosserat has been revived by Mindlin and others. This investigation is based on the equations presented in a paper by Mindlin and Tiersten and another paper by Mindlin. A general solution to the ring problem in the form of infinite series is obtained by applying the Helmholtz decomposition to the displacement vector and then using the finite Fourier transform. Several examples are solved using the general solution. For a disk loaded with a constant couple-stress on its boundary and a point moment at its center and for a ring loaded with constant couple-stresses on both boundaries, the solutions consist of a finite number of terms. For a disk loaded with a normal stress over a portion of its circumference and a point force at its center, the solution is an infinite series. An infinite series solution is also found for a layered media problem where a ring bonded to a disk of different material is loaded by a constant normal stress over a portion of its outer circumference while a point force is applied at the center of the disk. The first time problems are solved explicitly, but the last is solved numerically on a computer. An interesting part of the final results of the layered media problem is a boundary layer phenomenon exhibited at the interface by the shear stress in the radial direction. (Author)

AD-627 811 Fld. 20/11, 20/2
CFSTI Prices: HC $4.00 MF $0.75
NORTHWESTERN UNIV EVANSTON ILL DEPT OF MATERIALS SCIENCE
DISLOCATION DISTRIBUTIONS IN FATIGUED SINGLE CRYSTALS OF 3.25% SILICON-IRON.
Technical rept.,
by Kent Randall Carson. 3 Jan 66, 119p. Rept. no. TR-2
Contract Nonr-1228 (32) Proj. NR-039-086

Unclassified report

Descriptors: (*Fatigue (Mechanics), Iron alloys), (*Iron alloys, Silicon alloys), (*Crystal lattice defects, Distribution), Single crystals, Bending, Stresses, Tensile properties, Deformation, Electron microscopy

Fatigue tests were performed on single crystals of 3.25% silicon-iron oriented for single slip. The behavior of dislocations was studied in the early stages of the fatigue process as a function of temperature, number of cycles, and state of stress. A particular emphasis was placed upon observing tangle formation and growth. Part of the tests were performed by cycling about a zero mean stress in 4-point bending. Crystals were fatigued in this manner for various numbers of cycles at both 298K and 495K. The dislocation distributions were investigated by the etch pit technique and electron transmission microscopy. The remainder of the tests were performed in alternating tension. As before, cyrstals were fatigued for various numbers of cycles at both 298K and 425K. In this case, the dislocation distributions were investigated solely by electron transmission microscopy.

AD-627 888 Fld. 20/11
CFSTI Prices: HC $3.00 MF $0.75
TEXAS UNIV AUSTIN DEPT OF PHYSICS
INVESTIGATION OF SECOND ORDER ELASTIC PROPERTIES OF VARIOUS MATERIALS.
Technical rept.,
by D. S. Hughes, and J. L. Kelly. 1960, 70p.
Rept. no. TR-10
Contract N6onr-226 (08)

Unclassified report

Descriptors: (*Elasticity, Materials), Styrene plastics, Iron, Heat-resistant glass, Shear stresses, Hydrostatic pressure, Stresses, Strain (Mechanics), Failure (Mechanics), Velocity, Tensor analysis

The finite elastic theory of Murnaghan was applied to the problem of calculating dilatational and shear velocities through solids as a function of hydrostatic pressure and simple axial stress. Experiments were performed on three materials: polystyrene, Armco iron, and pyrex glass. The results of the theory were checked within experimental error, and three constants appearing in Murnaghan's theory were determined for these three materials. Pulse techniques were used to measure the velocities. For measurements under hydrostatic pressure, the method developed by Hughes, Pandrom, and Mims was used to obtain both dilatational and shear velocities with one experimental arrangement. For measurement of velocities under a simple axial stress, x-cut and y-cut crystals were used to obtain the two types of velocities. Results were good for the polystyrene, fair for the iron, and poor for the pyrex. The main limitation in the method arises from failure of the samples (in the case of axial stress) before measurable velocity changes are observed. (Author)

AD-627 961 Fld. 20/11
CFSTI Prices: HC $1.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF MECHANICAL ENGINEERING
APPLICATION OF VARIATIONAL EQUATION OF MOTION TO THE NONLINEAR ANALYSIS OF DYNAMIC BUCKLING,
by Yi-Yuan Yu. Jun 65, 25p. Rept. no. Scientific-4
Contract AF49 (638)-1290
AFOSR 65-1421

Unclassified report

Descriptors: (*Buckling (Mechanics), Equations of motion), (*Sandwich construction, Buckling (Mechanics), Vibration, Sheets, Sandwich panels, Calculus of variations

An integrated procedure has been proposed for applying the variational equation of motion to the analysis of nonlinear vibrations of solids. In this paper the procedure is extended to the analysis of nonlinear dynamic buckling. Example is given for a simply supported sandwich or homogeneous plate in plane-strain motion, one edge of which is fixed and the other subjected to a longitudinally oscillating displacement. Response curves for the parametrically excited, lateral vibration corresponding to the first instability region are presented. Results show that the transverse shear effect cannot be neglected for the sandwich plate, as in the case of ordinary, nonlinear lateral vibration of the plate. The transverse shear effect is, however, negligible for the homogeneous plate (Timoshenko beam), at least for the first instability region. (Author)

AD-627 962 Fld. 20/11, 20/4
CFSTI Prices: HC $2.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF MECHANICAL ENGINEERING
VIBRATIONS OF TWO-LAYERED PLATES.
Scientific rept.,
by Nann Ren, and Yi-Yuan Yu. Jun 65, 28p.
Rept. no. Scientific-5
Contract AF49 (638)-1290
AFOSR 65-1423

Unclassified report

Descriptors: (*Vibration, Sandwich construction), (*Sandwich construction, Vibration), Sheets, Equations of motion, Aerodynamic configurations, Numerical analysis

Four approximate theories of two-layered plates have been presented. Among these the two uncoupled classical theories of flexure and extension are the simplest. For the infinite plate the flexural theory gives the flexural branch and the extensional theory the equivoluminal and extensional branches of the frequency spectrum. The three branches all start from the origin and are in an ascending order as just stated. The classical theory that includes the effect of coupling between flexure and extension produces the same three branches of the frequency spectrum, in fact with little improvement over the uncoupled theories up to, say, 20,000 cps. The important thing to note, however, is that flexure and extension are in general coupled. Therefore, either type of excitation will induce both types of motion simultaneously, which can only be accounted for by the coupled theory.

AD-627 963 Fld. 20/11
CFSTI Prices: HC $1.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF MECHANICAL ENGINEERING
ON THE AXISYMMETRICAL VIBRATIONS OF CONICAL SHELLS.
Scientific rept.,
by Yukio Kagawa. Jun 65, 19p. Rept. no. Scientific-6
Contract AF49 (638)-1290
AFOSR 65-1422

Unclassified report

Descriptors: (*Vibration, Structural shells), (*Structural shells, Conical bodies), Numerical analysis, Equations of motion, Boundary value problems

In this paper it is shown that the fundamental frequencies of the axisymmetrical vibrations of conical shells can be predicted quite accurately by the extensional theory as long as the thickness of the shell is small compared with its length and the apex angle is not too wide. This is confirmed by comparing the results of the extensional theory with those of experiment and with those of the more exact theory including bending effect. (Author)

AD-627 429 See Fld. 20/13

AD-627 441 See Fld. 21/2

AD-627 697 See Fld. 12/1

AD-627 711 See Fld. 20/2

AD-627 748 See Fld. 20/12

AD-627 770 See Fld. 12/1

AD-627 929 See Fld. 11/6

20/12. SOLID STATE PHYSICS

AD-627 281 Fld. 20/12, 20/8
CFSTI Prices: HC $1.00 MF $0.50
ILLINOIS UNIV URBANA DEPT OF CHEMISTRY AND CHEMICAL ENGINEERING
MOSSBAUER STUDY OF CO57 (FE57) IN COBALTOUS OXIDE AT HIGH PRESSURE,
by C. J. Coston, R. Ingalls, and H. G. Drickamer. 1965, 11p. Contract Nonr-1834 (o5) ,AT (11-1)-1198
COO 1198-313
Unclassified report

Descriptors: (*Cobalt, Mossbauer effect), (*Iron, Mossbauer effect), (*Mossbauer effect, Hightemperature research), Line spectrum, Hyperfine structure, Cobalt compounds, Oxides, Impurities, Magnetic fields, Electric fields, Radioactive isotopes

An account is given of a room temperature study of the Mossbauer effect of Co57 (Fe57) in cobaltous oxide up to pressures of about 250 kbar. At atmospheric pressure the Mossbauer spectrum consists of an unsplit line characteristic of divalent Fe57 in a paramagnetic, cubic environment. As pressure is applied to the sample, the spectrum unfolds into a hyperfine pattern characteristic of divalent Fe57 in a magnetic, noncubic environment. This study is consistent with the fact that the Neel temperature of cobaltous oxide (291K at atmospheric pressure) increases with pressure. The pressure dependence of the internal magnetic field, electric field gradient and isomer shift are discussed. (Author)

AD-627 348 Fld. 20/12
CFSTI Prices: HC $4.00 MF $1.00
CARLYLE BARTON LAB JOHNS HOPKINS UNIV BALTIMORE MD
ENERGY TRANSFER BETWEEN EXCITED STATES OF HO (3+) IN LACL3.
Interim technical rept. no. 1,
by John F. Porter,Jr.. Jan 66, 143p. Contract DA-31-124-AROD-103 Proj. DA-20014501B11B
AROD 4194:4
Unclassified report

Descriptors: (*Holmium, Atomic energy levels), (*Lanthanum compounds, Chlorides), Crystals, Impurities, Ions, Excitation, Relaxation time, Phonons, Fluorescence, Promethium, Stark effect

The transfer of energy between excited states of Ho (3+) in LaCl3 was studied ar 4.2K. It was established that the ion pair process is responsible for the relaxation of the E level to the C level by exciting an adjacent ion from the ground state to the first excited state, Y. A similar process is responsible for the J to E relaxation but in this case the emission of a phonon is also required to conserve energy. The rise time for E fluorescence with J excitation was measured and found to be equal, within experimental error, to the J decay time. This indicates only that if there are special sites for the ion pair interaction, the transition rate for the process is comparable to the radiative rate. The temperature dependence of the decay of the 3H6 to the 3H5 in Pr (3+) as observed previously using the quantum counter technique is explained on the basis of a pair interaction. Comparisons are made with other investigations and areas of agreement or disagreement discussed.

AD-627 380 Fld. 20/12, 20/13, 20/3
PITTSBURGH UNIV PA DEPT OF PHYSICS
SPIN-DISORDER THERMAL RESISTIVITY OF THE FERROMAGNETIC TRANSITION METALS,
by Leroy Colquitt Jr.. 19 Apr 65, 9p. Contract AF-AFOSR-196-63
AFOSR 65-2093
Unclassified report

Availability: Published in The Physical Review, v139 n6A pA1857-65 13 Sep 1965. Copies to DDC users only.

Descriptors: (*Ferromagnetic materials, Thermal properties), (*Electrons, Spin), Transition elements, Transport properties, Thermal conductivity, Band theory of solids, Electron transitions, Iron, Cobalt, Nickel

Data of White and Woods for the thermal resistivity W of the transition metals show that W for Fe, Co, and Ni displays an anomalous persistent temperature dependence in the region just below and through the Debye temperature. Since W for the nonferromagnetic transition metals is approximately constant in this region, it is reasonable to attribute the additional temperature dependence to the well-known spin-disorder scattering of conduction electrons. It is shown, however, that a model which treats the magnetic d electrons as localized and neglects s-d transitions cannot account for the anomalous behavior of W, while a model which treats magroninduced s-d interband transitions presents a plausible explanation. (Author)

AD-627 381 Fld. 20/12, 20/2
CFSTI Prices: HC $1.00 MF $0.50
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
Quarterly rept. no. 11, 1 Jul-30 Sep 64,
by L. R. Shiozawa, J. M. Jost, and S. S. Devlin. 30 Nov 64, 25p. Contract AF33 (657)-7399
Unclassified report

See also AD-626 540.

Descriptors: (*Semiconductors, Solid state physics), Cadmium compounds, Sulfides, Cadmium alloys, Selenium alloys, Purification, Impurities, Single crystals, Silicon compounds, Dioxides, Crystal lattice defects, Luminescence, Hall effect, Thermal conductivity, Cryogenics

Purification of CdS by vacuum sublimation has resulted in more consistant yields of bright yellow single crystals having near intrinsic low-temperature electron mobility. The low-angle grain-boundaries present in seed-grown crystals was traced to surface damage on the seeds. Deep etching of seeds has eliminated this problem. Efforts to reduce the amount of SiO2 inclusion have resulted in only minor improvements. The formation of screw dislocations was traced to the SiO2 particles. The thermally stimulated 'tap effect' in CdS was investigated and is shown to be an electroluminescent effect which results from the pyroelectric nature of CdS. Room temperature edge emission in CdS was obtained when a crystal contained in an evacuated tube was excited by a high voltage, high frequency discharge on the outside of the tubes. The experimental Hall mobility of CdSe is compared with the complete theory and results indicate that these crystals are only weakly compensated. (Author)

AD-627 390 Fld. 20/12, 20/10
CFSTI Prices: HC $1.00 MF $0.50
CALIFORNIA UNIV LA JOLLA
A NEW FORMULATION OF THE INHOMOGENEOUS ELECTRON GAS PROBLEM.
Technical rept.,
by W. Kohn. 19 Jan 66, 24p. Rept. no. TR-37 Contract Nonr-2216 (11) Proj. NR-017-630
Unclassified report

Presented at Summer Seminar for Theoretical Physics, Tokyo 5-17 Sept 1965.

Descriptors: (*Electrons, Quantum statistics), (*Excitation, Electrons), Atomic energy levels, Metals, Ground state, Density, Hartree-Fock approximation, Field theory

A new approach to the quantum mechanical problem of the inhomogeneous electron gas is developed. The central quantities in this theory are the local electron density and various functionals of the density in which the properties of the system are incorporated. The lectures encompass the general theory and, as applications, new selfconsistent equations which are extensions of the Hartree and Hartree-Fock equations, as well as a discussion of elementary excitations. Preliminary numerical results also are presented. (Author)

AD-627 392 Fld. 20/12, 18/8
CFSTI Prices: HC $2.00 MF $0.50
RENSSELAER POLYTECHNIC INST TROY N Y
INVESTIGATION OF TRANSIENT RADIATION DAMAGE IN SEMICONDUCTOR MATERIALS.
Quarterly progress rept. no. 9, 1 Feb-30 Apr 65,
by Ronald M. Lichtenstein, H. James Willard Jr., John C. Corelli, A. Robb Frederickson, and James W. Westhead. 30 Apr 65, 31p. Contract DA-36-039-AMC-02165 (E) Proj. DASA-5974-01-004-36 Task 5974010043600
Unclassified report

See also AD-627 293.

Descriptors: (*Semiconductors, Electron bombardment), (*Electron bombardment, Semiconductors), Silicon, Life expectancy, Photoconductivity, Hall effect, Damage, Radiation damage, Conductivity

Tests for transient radiation damage in 6300 ohm-cm, 600 ohm-cm and 27 ohm-cm p-type silicon were made using a photoconductivity method reported previously. It was found that transient effects exist at 600 usec following the electron pulse in the 600 ohm-cm sample. No effect was observed for the 6300 ohm-cm sample after 600 usec, and the results for the 27 ohm-cm sample were inconclusive. The behavior of medium resistivity n- and p-type silicon during and immediately after irradiation by approximately 48 MeV electron pulses was investigated. Irradiations were performed at temperatures from 80K - 300K. The more general results observed are: (1) the long tail decay of the conductivity pulse increases with both pulse size and total exposure on n-type material, but there is no long tail in p-type silicon: (2) saturation time increases nonlinearly with pulse size; (3) response curve shapes vary greatly with temperature. A low-noise system is described which is used in this study of transient radiation effects in silicon. The system allows conductivity and Hall effect voltage transients to be measured on bridge-type silicon samples. A cryostat incorporated in the system allows the sample to be irradiated at any temperature from 100K to 350K. Tests of the equipment were run with the RPI Linac and show that noise signals can be reduced to 100 uV. (Author)

AD-627 393 Fld. 20/12, 18/8
CFSTI Prices: HC $1.00 MF $0.50
RENSSELAER POLYTECHNIC INST TROY N Y

INVESTIGATION OF TRANSIENT RADIATION DAMAGE IN SEMICONDUCTOR MATERIALS.
Supplement 9A, 1 May-31 Jul 65,
by Roland M. Lichtenstein, H. James Willard Jr., John C. Corelli, A. Robb Frederickson, and James W.Westhead. 31 Jul 65, 21p. Contract DA-36-039-AMC-02165 (E) Proj. DASA-5974-01-004-36 Task 5974010043600
Unclassified report

Rept. no. 9A, supplement to Quarterly progress rept. no. 9, 1 Feb-30 Apr 65, AD-627 392.

Descriptors: (*Semiconductors, Electron bombardment), (*Electron bombardment, Semiconductors), Silicon, Life expectancy, Photoconductivity, Hall effect, Conductivity, Damage, Radiation damage

Tests for transient radiation damage in 6300 ohm-cm, 600 ohm-cm and 27 ohm-cm p-type silicon were made using a photoconductivity method reported previously. It was found that transient effects exist at 600 usec following the electron pulse in the 600 ohm-cm sample. No effect was observed for the 6300 ohm-cm sample after 600 usec, and the results for the 27 ohm-cm sample were inconclusive. The behavior of medium resistivity n- and p-type silicon during and immediately after irradiation by approximately 48 MeV electron pulses was investigated. Irradiations were performed at temperatures from 80K - 300K. The more general results observed are: (1) the long tail decay of the conductivity pulse increases with both pulse size and total exposure on n-type material, but there is no long tail in p-type silicon; (2) saturation time increases non-linearly with pulse size; (3) response curve shapes vary greatly with temperature. A low-noise system is described which is used in this study of transient radiation effects in silicon. The system allows conductivity and Hall effect voltage transients to be measured on bridge-type silicon samples. A cryostat incorporated in the system allows the sample to be irradiated at any temperature from 100K to 350K. Tests of the equipment were run with the RPI Linac and show that noise signals can be reduced to 100uV. (Author)

AD-627 470 Fld. 20/12, 20/3, 20/2
CFSTI Prices: HC $1.00 MF $0.50
NATIONAL ELECTROTECHNICAL INST TURIN (ITALY)
EXPERIMENTS OF AC-ELECTROLUMINESCENCE OF CU DOPED ZNS SINGLE CRYSTALS.
Technical note,
by G. Bonfiglioli, P. Brovetto, and A. Mojoni.
Sep 65, 17p. Rept. no. TN-5
Contract AF-EOAR-87-63 Proj. AF-9763 Task 976302
AFOSR 65-2098
Unclassified report

Descriptors: (*Electroluminescence, Single crystals), (*Zinc compounds, Sulfides), Semiconductors, Doping, Copper, Heat treatment, Aging materials, Crystal lattices

The ac electroluminescence (EL) of Cu-doped ZnS single crystals is reported. Several aspects of a thermally induced aging effect are briefly described, which include evolution with the thermal treatment of the light-voltage relationship parameters, hardness increase, dislocations decoration, and optical microscope evidence of the conversion of the EL patterns from 'hairlike' to 'comet-shaped' form. Pictures are also shown, that give information as to the phase relationship of the light emitted from different specimen areas. The qualitative implications of these results as to the current theories are discussed, particularly their inconsistency with the mechanism of impact ionization. (Author)

AD-627 471 Fld. 20/12
SYRACUSE UNIV N Y
RADIATIVE ELECTRON TRANSFER FROM SHALLOW DONORS TO SHALLOW ACCEPTORS IN SILICON,
by A. Honig, and R. Enck. 1965, 10p. Contract AF-AFOSR-425-63 Proj. AF-9763 Task 976302
AFOSR 65-1905
Unclassified report

Availability: Published in Proceedings of International Conference on Phys. Semiconductors, (7th), Paris, France v4 p113-20 1965. Copies to DDC users only.

Descriptors: (*Carriers (Semiconductors), Transport properties), (*Electrons, Silicon), Cryogenics, Electron spin resonance, Fiber optics, Phonons, Band theory of solids

Characteristic radiation spectra emitted in the process of spontaneous electron transfer from shallow donors to shallow acceptors at liquid helium temperatures have been measured. The spectra exhibit features either not present or not identified in previous low temperature recombination radiation studies in silicon. The experiments were performed between 1.05K and 4.70K on double doped n-type silicon; electron spin resonance of the neutral donors was employed to measure the electron transfer rates and three different optical techniques were used, the most accurate involving a fiber optics light pipe. The values determined for the phonon energies are: TA phonon - .018 ev, TO phonon - .058 ev, and 1/2 (2 TO) phonons - .060 ev. The band gap is determined to be 1.174 ev or possibly 1.164 ev with a different interpretation of the association of the peak photon energy. (Author)

AD-627 523 Fld. 20/12, 9/3
CFSTI Prices: HC $2.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
MICROWAVE PROPERTIES OF ALUMINUM SUBSTITUTED YIG AT LOW TEMPERATURES, AS A FUNCTION OF FREQUENCY.
Technical rept.,
by Thomas Collins, and Isidore Bady. Dec 65, 28p. Rept. no. ECOM-2649
Proj. DA-1C0-24401-A-348 Task 1C0-24401-A-348-00
Unclassified report

Descriptors: (*Garnet, Microwave frequency), Aluminum compounds, Yttrium compounds, Magnetic properties, Magnetic resonance, Low-temperature research, Ultrahigh frequency, Standing wave ratios

Data is given on the microwave properties of a series of polycrystalline aluminum substituted YIG over the temperature range of -65C to room temperature. The range of 4 pi Ms is from 200 to 1005 gauss. Each sample was measured at several frequencies over the range where it would normally by used in devices. Thus measurements were made from 450 to 1200 megacycles for the 200 gauss material, and from 1200 to 4000 megacycles for the 1005 gauss material. The data is presented in plots of the ferrimagnetic resonance curves, and tabulations of the linewidth, maximum value of the loss component of susceptibility, and biasing fields at which these maximums occured. Measurements were made using a special coaxial sample holder connected to a coaxial slotted line through a right angle connector. The sample holder was submerged in a liquid bath maintained at the desired temperature. The loss component of susceptibility was calculated from VSWR measurements. The derivation of the formula for calculating the loss term of susceptibility from VSWR, is outlined.

AD-627 545 Fld. 20/12, 11/6
CALIFORNIA UNIV LA JOLLA
INDIUM-THALLIUM: TEMPERATURE DEPENDENCE OF THE TETRAGONAL-CUBIC TRANSFORMATION TO 3 K,
by H. L. Luo, J. Hagen, and M. F. Merriam. 2 Mar 65, 4p. Contract AF-AFOSR-631-64 Proj. AF-9763 Task 976302
AFOSR 65-2106
Unclassified report

Availability: Published in Acta Metallurgica v13 n9 p1012-3 1965. Copies to DDC users only.

Descriptors: (*Indium alloys, Thallium alloys), (*Cryogenics, Indium alloys), Transformations, Transition temperature, Diffraction analysis, Superconductivity, Phase studies

Determination has been made of the composition of the tetragonal-cubic transformation at temperatures down to 3 K for IN-T1 alloys. Diffraction patterns were obtained with a GE XRD-5 diffractometer utilizing CuK alpha radiation. Although diffractometer observations were not made below 20.4 K, the position of the phase boundary at approx 3 K is inferred from measurements of superconducting transition temperature vs composition. It is estimated that samples containing 29 at-% or less thallium are at least 95-99% or more transformed to the tetragonal phase at 3 K. The samples of 29-31% T1 could be 2-phase, or they could be singlephase tetragonal but severely strained. (Author)

AD-627 546 Fld. 20/12, 7/4
NEW SOUTH WALES UNIV KENSINGTON (AUSTRALIA) DEPT OF APPLIED MATHEMATICS
SHAPE RESONANCES IN SUPERCONDUCTING CYLINDERS,
by Colin J. Thompson. 14 Dec 64, 9p. Contract AF-AFOSR-62-400 Proj. AF-9751 Task 975101
AFOSR 65-2975
Unclassified report

Availability: Published in The Journal of Physics and Chemistry of Solids v26 p1053-60 1965. Copies to DDC users only.

Descriptors: (*Resonance, Cylindrical bodies), (*Superconductivity, Resonance), Iterative methods, Partial differential equations, Energy, Australia

The energy gap equation for a superconducting circular cylinder at zero temperature is solved numerically for diameters in the range 10-17 A.U. As for the uniform membrane, the energy gap shows pronounced resonances when considered as a function of size. The resonances occur each time an eigenvalue for motion perpendicular to the cylinder axis passes through the Fermi surface. The peaks of the resonances lie well above the bulk value for the energy gap. The peaks are very sharp and for most values of the diameter, the energy gap is small and shows a tendency to remain small. (Author)

AD-627 577 Fld. 20/12, 20/8
CALIFORNIA UNIV LA JOLLA
TRANSVERSE CONDUCTIVITY OF A DEGENERATE SYSTEM OF LANDAU ELECTRONS AND OPTICAL PHONONS.
Technical rept. (Revised ed.),
by Lowell Dworin. 21 Jul 65, 20p. Rept. no. TR-38
Contract Nonr-2216(11) Proj. NR-017-630
Unclassified report

Revision of manuscript received 10 May 65.

Availability: Published in Physical Review v140 n5A pA1689-1704 Nov 29, 1965. Copies to DDC users only.

Descriptors: (*Electrons, Transport properties), (*Phonons, Transport properties), Indium alloys, Antimony alloys, Magnetic fields, Conductivity, Hamiltonian, Quantum mechanics, Electron spin resonance

The transverse conductivity of a system of independent electrons weakly interacting with a gas of optical phonons in an external magnetic field is obtained.

AD-627 622 Fld. 20/12, 20/2
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION SYDNEY (AUSTRALIA) DIV OF PHYSICS
THE THERMAL EXPANSION OF ALKALI HALIDES AT LOW TEMPERATURES.
Revised ed.,
by G. K. White. 13 Jan 65, 16p. Contract AF-AFOSR-62-391 Proj. AF-9763 Task 976301
AFOSR 65-2549

Unclassified report

Revision of manuscript submitted 17 Aug 64.

Availability: Published in Proceedings of the Royal Society, A, v286 p204-17 1965. Copies to DDC users only.

Descriptors: (*Thermal expansion, Alkali metal compounds), (*Alkali metal compounds, Halides), (*Halides, Alkali metal compounds), Cryogenics, Solid state physics, Crystals

Linear thermal expansions of eight alkali halides have been determined at liquid oxygen temperatures and at temperatures from 30K down to 2K. For temperatures T (equal to or less than) theta/20, where theta is the Debye temperature, the expansion coefficients are well represented by alpha = AT cubed + BT to the 5th power. Values are reported for the Gruneisen parameter gamma = 3 alpha V/C chi, where C/V is the heat capacity per unit volume and chi is the compressibility. For CsBr (b.c.c. structure) gamma appears to be nearly independent of temperature, with a value of 2.0 but for the other crystals, which have the rock-salt structure, the parameter gamma varies with temperature, chiefly between theta/10 and theta/5. At room temperature, gamma lies between 1.45 and 1.7 but at low temperature this generally decreases to a value gamma sub 0, which is ca. -0.1 for RbI, + 0.3 for KCl, KBr and KI and 1.0 for NaCl and NaI; LiF does not show this decrease, gamma sub 0 being 1.7. The values observed for gamma sub 0 are compared with those calculated from elastic constants and their pressure derivatives and the general behaviour of gamma (T) is observed to conform qualitatively to the predictions of simple theoretical models of Born, Blackman and Barron. (Author)

AD-627 632 Fld. 20/12
ILLINOIS UNIV URBANA DEPT OF PHYSICS
ELECTRON CAPTURE BY ALPHA AND F CENTERS IN KBR,
by Richard S. Crandall. 23 Nov 64, 7p. Contract AF49 (638)-529 Proj. AF-9760 Task 976002
AFOSR 65-2032

Unclassified report

Availability: Published in The Physical Review, v138 n4A pA1242-6 17 May 1965. Copies to DDC users only.

Descriptors: (*Potassium compounds, Bromides), (*Color centers, Electron capture), (*Electron capture, Color centers), Crystal lattice defects, Photoconductivity, Probability, Photons, Band theory of solids

Photoconductivity measurements were made on KBr containing alpha, F, and F' centers to determine the electron-trapping probability (probability per unit time that one defect per cu. cm. traps an electron) of the F center and the alpha center or negative-ion vacancy. The electron-trapping probability of the alpha center increases from 0.0000003 cu. cm./sec at 118K to 0.0006 cu. cm./sec at 24K. The electron-trapping probability of the F center increases from 0.0000003 cu. cm./sec at 118K to 0.000004 cu. cm./sec at 24K. The initial capture of an electron by an alpha center results in the formation of an excited F center. The binding energy of this excited state is found to be 0.130 ev, corresponding to the first excited state of the F center. Electron capture by an F center is interpreted as occurring through the formation of an excited F' center. The binding energy of this state is found to be between 0.04 and 0.08 ev. (Author)

AD-627 705 Fld. 20/12, 7/3
CFSTI Prices: HC $4.00 MF $0.75
CLARK UNIV WORCESTER MASS
TRANSITION METAL COMPLEXES AS POTENTIAL SEMICONDUCTORS.
Final technical rept.,
by S. C. Kwan, and A. M. Zwickel. 31 Dec 65, 114p. Contract Nonr-3694 (01) Proj. NR-051-440

Unclassified report

Descriptors: (*Semiconductors, Metalorganic compounds), (*Metalorganic compounds, Transition elements), Complex compounds, Electrical properties, Tunneling (Electronics), Carriers (Semiconductors)

Electron transfer reaction mechanisms were studied through the measurement of the electrical properties of the coordination complex tris- (o-phenanthroline) iron (II)-hexachloroiridate and its analogs, as well as the organic ligands dipyridyl and orthophenanthroline. The plots of log C vs. 1/T for these complexes have a break in the curve, indicating the presence of both intrinsic and extrinsic conduction paths where C is the conductivity. The unusually high value for C at infinite temperature is shown to be consistent with a quantum mechanical tunneling model based on the formation of charge carriers and ion pairs from the neutral species constituting the microcrystallites. A current can be maintained when, under the influence of an electric field, the charge carriers undergo tunneling through a potential barrier formed at the edges of the microcrystallites. It is shown that a relationship between the mechanism for the conduction of these complexes and that for the organic ligands should exist.

AD-627 716 Fld. 20/12
PENNSYLVANIA STATE UNIV UNIVERSITY PARK
MECHANISM OF THE PRECIPITATION OF THE SPINEL FROM MGO-AL2O3 SOLID SOLUTIONS.
Revised ed.,
by V. S. Stubican, and Rustum Roy. 8 Feb 65, 9p. Contract AF49 (638)-957 Proj. AF-9761 Task 976102
AFOSR 65-2024

Unclassified report

Revision of manuscript submitted 13 Oct 64.

Availability: Published in The Journal of Physics and Chemistry of Solids v26 p1293-7 1965. Copies to DDC users only.

Descriptors: (*Spinels, Chemical precipitation), (*Aluminum compounds, Solid solutions), (*Magnesium compounds, Solid solutions), Oxides, Solubility, Crystal lattice defects, Crystal lattices, Density, X-ray diffraction analysis, Diffusion, Nucleation, Grain boundaries

The point defects present in the MgO-Al2O3 crystalline solutions were investigated by using precise cell dimensions and density measurements. The precipitation of the spinel from crystalline solutions was studied by quantitative x-ray diffraction. It was found that the precipitation is a diffusion controlled process. Under the experimental conditions the growing particles are probably approximately spheroidal. Electron probe investigations showed that the preferred sites for the nucleation and the precipitation of spinel were the grain boundaries and intergranular voids. (Author)

AD-627 747 Fld. 20/12, 20/6
ILLINOIS UNIV URBANA
IRRADIATION-INDUCED BROADENING OF THE F-ABSORPTION BAND IN KCl,
by Hiroyuki Mizuno, and W. Beall Fowler. 21 Jun 65, 11p. Contract AF-AFOSR-62-179 Proj. AF-9761 Task 976101
AFOSR 65-2589

Unclassified report

Availability: Published in Journal of the Physical Society of Japan v20 n10 p1888-94 Oct 1965. Copies to DDC users only.

Descriptors: (*Potassium compounds, Chlorides), (*Color centers, Radation damage), Absorption sepctrum, Crystal lattice defects, Impurities, Sodium, Band spectrum

Earlier workers observed that in the initial stages of room-temperature F-band irradiation of additively -colored, freshly-quenched alkali halide crystals a low energy broadening of the F band appeared. Here this broadening in KCl was measured and similar results for two very different sodium concentrations were obtained. This indicates that sodium FA centers are not responsible for the effect. The 'resonance broadening' due to the dipolar interaction of two F centers was calculated. It was found that this mechanism could account for the observed phenomenon if most of the F centers were about 3 nearest neighbors apart, or if 5% of them were about 2 nearest neighbors apart. Published experimental results indicate that in the early stages of irradiation few of the F centers are this close together, although a number as small as 5% is not necessarily ruled out. Other possible explanations of the experimental results are discussed.

AD-627 748 Fld. 20/12, 20/11
MICHIGAN TECHNOLOGICAL UNIV HOUGHTON DEPT OF METALLURGY
DIFFUSION OF ANTIMONY IN GERMANIUM DURING PLASTIC STRAINING.
Revised ed.,
by C. D. Calhoun, and L. A. Heldt. 16 Feb 65, 3p. Contract AF-AFOSR-62-290
AFOSR 65-2560

Unclassified report

Revision of Manuscript submitted 19 Nov 1964.

Availability: Published in Acta Metallurgica, v13 n8 p932-3 1965. Copies to DDC users only.

Descriptors: (*Antimony, Diffusion), (*Deformation, Germanium), (*Germanium, Doping), Strain (Mechanics), Plasticity, Diffusivity, Semiconductors

AD-627 751 Fld. 20/12
BRIGHAM YOUNG UNIV PROVO UTAH
EFFECT OF PRESSURE ON THE INTERMETALLIC DIFFUSION OF SILVER IN LEAD,
by H. R. Curtin, D. L. Decker, and H. R. Vanfleet. 12 Apr 65, 6p. Contract AF-AFOSR-201-63
AFOSR 65-2588

Unclassified report

Availability: Published in The Physical Review v139 n5A pA1552-7 Aug 30 1965. Copies to DDC users only.

Descriptors: (*Silver, Diffusion), (*Lead, Impurities), Tracer studies, Melting point, Pressure, Atomic properties, Crystal structure, Heat of activation

The diffusion of silver-110 into lead was investigated using radioactive-tracer techniques in a temperature range within 200C of the melting point of lead for six pressures between 0 and 40 kbar. The activation energy was found to increase from 15.2 to 21.9 plus or minus 0.3 kcal/mole as the pressure increased from atmospheric to 39.2 kbar. The activation volume for pressures below 11.9 kbar ranged from 0.54 plus or minus 0.06 to 0.48 plus or minus 0.05 atomic volumes as the temperature decreased from 769 to 556K. Above 11.9 kbar the activation volume was nearly constant

at 0.38 plus or minus 0.03 atomic volumes over the same temperature interval. As a result of the large decrease in the activation volume that occurs between 0 and 11.9 kbar it is suggested that the diffusion process for silver into lead changes from a composite of interstitial plus vacancy to an interstitial mechanism. Therefore the activation volume of 0.38 plus or minus 0.03 atomic volumes as measured for pressures above 11.9 kbar represents the activation volume of motion characterizing the interstitial mechanism. Within the accuracy of the experimental data for lnD versus (Melting temperature)/temperature the results suggest that the ratio of activation energy to melting temperature of the solvent at a given pressure is independent of pressure to 40 kbar. (Author)

AD-627 779 Fld. 20/12, 20/6
ILLINOIS UNIV URBANA DEPT OF PHYSICS
U CENTER IN POTASSIUM BROMIDE,
by Howard K. Rockstad. 3 May 65, 7p. Contract AF49 (638)-529 Proj. AF-9763 Task 976302 AFOSR 65-2552

Unclassified report

Availability: Published in The Physical Review v140 n1A pA311-6 Oct 4 1965. Copies to DDC users only.

Descriptors: (*Potassium compounds, Bromides), (*Color centers, Optical properties), Crystal lattice defects, Photons, Band spectrum, Absorption spectrum, Ions, Hydrides, Perturbation theory

The absolute quantum efficiency for the destruction of U centers and the formation of anion vacancies in KBr at 78K has been found to be 0.61 plus or minus 0.07 when the U optical absorption band is bleached by 225-millimicrons radiation absorbed at the maximum of the U band. The quantum efficiency decreases significantly as the energy of the absorbed photons increases. It is suggested that the high-energy tail of the U band is due to a secondary band and that the quantum efficiency of this band is 61 percent of that of the primary U band. Previous results concerning the formation of isolated anion vacancies and interstitial hydride ions and interacting pairs of these entities are confirmed. However, the oscillator strengths of the perturbed alpha bands are found to be equal to that of the unperturbed alpha band. (Author)

AD-627 837 Fld. 20/12, 11/6
CFSTI Prices: HC $1.00 MF $0.50
GENERAL ELECTRIC CO SCHENECTADY N Y RESEARCH AND DEVELOPMENT CENTER
AN ATOMIC VIEW OF SURFACE SELF-DIFFUSION: TUNGSTEN ON TUNGSTEN,
by Gert Ehrlich, and F. G. Hudda. Oct 65, 25p. Rept. no. 65-C-038
Contract AF49 (638)-1362
AFOSR 65-2883

Unclassified report

Descriptors: (*Tungsten, Diffusion), Crystal lattices, Atomic properties, Crystal structure, Surface properties, Microstructure

Surface diffusion of tungsten adatoms on several smooth, low index planes of the tungsten lattice has for the first time been followed by direct observation of individual atoms in the ion microscope. Contrary to expectation, the mobility at room temperature is found to increase in the order (211) > (321) approx. = (110) > (310) approx. = (111). Migrating atoms are reflected at the boundaries of the (110), (211), and (321) planes; on the latter two, motion along atomic rows is favored over diffusion across lattice steps. From quantitative determinations of the rate of change of the mean square displacement, diffusion coefficients were obtained. Differences in diffusion on the (211) and (321)--planes of very similar structure--suggest a weakening of interatomic forces at lattice edges. (Author)

AD-627 855 Fld. 20/12
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
SEVERAL TERNARY COMPOUNDS OF THE TYPE-A (I)B (I)2C (V)3,
by V. I. Sokolova, and E. V. Tsvetkova. 5 Nov 65, 11p. Rept. no. FTD-TT-65-765
TT 66-60484

Unclassified report

Unedited rough draft trans. of mono. Issledovaniya po Poluprovodnikam; Novye Poluprovodnikovye Materialii, Kishinev, 1964 p168-72.

Descriptors: (*Semiconductors, Phase studies), (*Phase studies, Semiconductors), Intermetallic compounds, Transormations, X-ray diffraction analysis, Microstructure, Silver alloys, Gold alloys, Copper alloys, Silicon alloys, Germanium alloys, Tin alloys, Lead alloys, Phosphorus alloys, Arsenic alloys, Antimony alloys, Bismuth alloys, USSR

Results are reported of phase studies of semiconducting systems comprised of: one part copper, silver, or gold; to two parts silicon, germanium, tin, or lead; to three parts phosphorus, arsenic, antimony, or bismuth.

AD-627 891 Fld. 20/12
CFSTI Prices: HC $3.00 MF $0.75
ROME AIR DEVELOPMENT CENTER GRIFFISS AFB N Y RELIABILITY BRANCH
SEMICONDUCTOR RELIABILITY: THE CORRELATION OF EXCESS NOISE WITH DELETERIOUS SURFACE PHENOMENA.
Technical rept.,
by Edgar A. Doyle,Jr., Jack S. Smith, and Gerald G.Sweet. Dec 65, 83p. Proj. AF-DS-63-10
RADC TR-65-379

Unclassified report

Descriptors: (*Semiconductors, Noise), Surface properties, Silicon, Electrical properties, Acoustical properties, Semiconductor devices, Solid state physics, Reliability (Electronics)

The properties of 1/f (excess) noise present in semiconductor p-n junctions under normal operating conditions, including noise voltage, frequency dependence, noise frequency exponent alpha, and the noise voltage-reverse leakage current proportionality constant K', are described. Variations in these excess noise parameters, when the semiconductor surface is subjected to various external ambients, have been demonstrated and indicate that excess noise in semiconductor devices can be associated with the surface in general and, more specifically, with surface inversion layer or channel formation. Techniques employed in excess noise measurements and for detecting semiconductor surface inversion are described. The applicability of gross excess noise voltage, noise frequency exponent alpha, and the noise proportionality constant (K') measurements for use as a reliability screening technique is discussed. (Author)

AD-627 960 Fld. 20/12, 20/6
CALIFORNIA UNIV RIVERSIDE
MEASUREMENT OF OPTICAL ABSORPTION IN AN ELECTRIC FIELD,
by L. M. Lambert. 9 Dec 64, 4p. Contract AF-AFOSR-523-64
AFOSR 65-2535

Unclassified report

Prepared in cooperation with Aerospace Corp., San Bernardino, Calif.

Availability: Published in Physical Review, v138 n5A pal569-72 31 May 1965. Copies to DDC users only.

Descriptors: (*Semiconductors, Optical properties), (*Infrared radiation, Absorption), (*Electric fields, Semiconductors), Absorption spectrum, Gallium alloys, Arsenic alloys, Dielectrics

Optical absorption by semiconductors and insulators in electric fields has been of interest for several decades. Recently, Franz and Keldysh have independely presented theories which permit an estimation of the magnitude of effects observed. More recently, Callaway developed a more elaborate formulation which permits accurate computation of absorption coefficients. It is the purpose of this work to present the results of an investigation of Callaway's theory. Optical absorption in oriented single crystals of semiinsulating gallium arsenide was investigated over the temperature range 300 to 85K using non-ohmic contacts and a synchronized pulse-train generator. The Cary 14R recording spectrophotometer was used with a spectral purity between 5 to 9 A in the IR No. 1 mode of operation. The fields used varied between 10,000 and 100,000 V/cm. (Author)

AD-627 300 See Fld. 5/1

AD-627 353 See Fld. 20/5

AD-627 406 See Fld. 20/2

AD-627 482 See Fld. 20/1

AD-627 483 See Fld. 7/4

AD-627 520 See Fld. 5/1

AD-627 561 See Fld. 20/3

AD-627 566 See Fld. 20/5

AD-627 618 See Fld. 20/3

AD-627 673 See Fld. 9/5

AD-627 720 See Fld. 20/6

AD-627 726 See Fld. 20/5

AD-627 727 See Fld. 20/5

AD-627 749 See Fld. 20/2

AD-627 938 See Fld. 7/2

AD-628 025 See Fld. 9/3

20/13. THERMODYNAMICS

AD-627 387 Fld. 20/13, 7/4
CFSTI Prices: HC $3.00 MF $0.75
MANLABS INC CAMBRIDGE MASS
COMPUTATIONAL PROBLEMS IN THE THERMODYNAMICS OF PHASE EQUILIBRIA AND VAPORIZATION KINETICS.
Semi-Annual rept. no. 1,
Sep 65, 68p. Contract AF33 (615)-2352

Unclassified report

Descriptors: (*Thermodynamics, Phase studies), (*Phase studies, Equilibrium), (*Vaporization, Kinetic theory), Mathematical prediction, Vapor pressure, Eutectics, Melting point, Heat of formation, Thermochemistry, Statistical mechanics

Numerical predictions are made of certain equilibrium thermodynamic features of real systems: phase limits, vapor pressure, congruent vaporization compositions, eutectic points, melting point maxima, composition dependence of the heats of formation of compounds, etc. This theoretical model can be used to correlate diverse thermochemical data. The equilibrium phase diagram is calculated, using statistical thermodynamical models of certain homogenous phases, namely a regular solution phase (solid or liquid) and a nonstoichiometric solid compound phase.

AD-627 429 Fld. 20/13, 20/11
CFSTI Prices: HC $1.00 MF $0.50
BROWN UNIV PROVIDENCE R I DIV OF APPLIED MATHEMATICS
SURFACE TEMPERATURES OF TWO RUBBING BODIES.
Technical rept.,
by George T. Symm. Dec 65, 25p. Contract Nonr-562 (36) Proj. NR-044-309
Unclassified report

Descriptors: (*Surface temperatures, Friction), (*Friction, Velocity), Thermal conductivity, Integral equations

An investigation is described into the behaviour of the surface temperatures of two rubbing bodies as the velocity of one of them tends to zero. An examination of the partition of heat between the two bodies is included. (Author)

AD-627 484 Fld. 20/13, 20/4
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE .
THE DETERMINATION OF FORCED-CONVECTION SURFACE-BOILING HEAT TRANSFER,
by A. E. Bergles, and W. M. Rohsenow. 23 Apr 63, 10p. Contract AF 19 (604)-7344
AFOSR 65-1439
Unclassified report

Prepared for presentation at the ASME-AIChE Heat Transfer Conference and Exhibit, Boston, Mass., August 11-14, 1963 as paper no. 63-HT-22.

Availability: Published in Journal of Heat Transfer, p1-8 1963. Copies to DDC users only.

Descriptors: (*Heat transfer, Boiling), (*Boiling, Convection (Heat transfer)), Surface properties, Bubbles, Boiling point

The characteristics of the boiling curve for forced -convection surface boiling are examined in detail. In the region of low wall superheat, the heat transfer can be predicted by available correlations for forced convection. An analysis is presented for the inception of first significant boiling. Experimental results are in good agreement with analytical predictions. Pool -boiling data were taken under saturated and subcooled conditions for surfaces similar to those used in forced-convection surface boiling. These data indicate that the curves for forced-convection surface boiling cannot be based on data for saturated pool boiling but must rather be based on actual forced-convection data. (Author)

AD-627 496 Fld. 20/13
CHICAGO UNIV ILL
NEW THERMODYNAMIC POTENTIAL EFFECTS IN HELIUM II,
by R. J. Donnelly. 25 May 65, 4p. Contract AF-AFOSR-785-65 ,NSF-GP-2693 Proj. AF-9767 Task 976701
AFOSR 65-2080
Unclassified report

Availability: Published in Physics Letters v17 n2 p109-10 1 Jul 1965. Copies to DDC users only.

Descriptors: (*Helium, Liquefied gases), (*Thermodynamics, Helium), Potential theory

The purpose of this communication is to show that a number of thermodynamic potential effects may be observed between 2 baths of liquid helium II connected by a narrow channel, e.g., the saturated film, through which only the superfluid can pass. The effects discussed include pressure effects, centrifugal potential effects, and the effects of external fields other than gravity. (Author)

AD-627 505 Fld. 20/13, 20/4
MINNESOTA UNIV MINNEAPOLIS SCHOOL OF PHYSICS
QUANTIZED VORTICES AND THE SUPERFLUID HELIUM ANALOG OF THE AC JOSEPHSON EFFECT,
by W. Zimmermann,Jr.. 4 May 65, 4p. Contract AF-AFOSR-793-65
AFOSR 65-2084
Unclassified report

Availability: Published in Physical Review Letters v14 n24 p976-9 Jun 14 1965. Copies to DDC users only.

Descriptors: (*Superfluidity, Vortices), (*Vortices, Quantum mechanics), Helium, Hydrodynamics, Equations of motion

It is shown that an equation dealing with superfluid helium, derived using the concept of a complex order parameter for the liquid, can also be derived from the conventional equations of two fluid hydrodynamics combined with the assumption of quantization of vorticity in the superfluid.

AD-627 557 Fld. 20/13
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
MIGRATION OF A LIQUID ZONE THROUGH A SOLID, PART III,
by W. A. Tiller. 11 May 64, 5p. Contract AF49 (638)-1177 Proj. AF-3817
AFOSR 65-1998
Unclassified report

Availability: Published in Journal of Applied Physics v36 n1 p261-3 Jan 1965. Copies to DDC users only.

Descriptors: (*Zone melting, Electric fields), (*Solids, Zone melting), Theory, Anisotropy, Thermal diffusion, Diffusion, Gallium compounds, Arsenides, Freezing, Evaporation, Condensation

A theoretical analysis of the migration of a liquid zone through a solid (AD-406 472, AD-406 474) is extended to include nonconservative systems where atoms are exchanged between the liquid zone and the environment. It applies to both evaporation and condensation of either the solute or the solvent species. When the vapor exchange is such as to increase or decrease the liquid temperature of the zone, the zone migration velocity increases or decreases, respectively, in a linear manner with zone size. For certain conditions it is possible to produce a zone of constitutionally supercooled liquid ahead of the freezing interface. The migration rates of gallium alloy zones through GaAs are quantitatively consistent with this treatment. (Author)

AD-627 725 Fld. 20/13, 20/4, 20/10
CHICAGO UNIV ILL INST FOR THE STUDY OF METALS
THEORY OF THE INTERACTION OF IONS AND QUANTIZED VORTICES IN ROTATING HELIUM II,
by R. J. Donnelly. 4 Dec 64, 4p. Contract AF-AFOSR-785-65 ,NSF-GP-2693 Proj. AF-9767 Task 976701
AFOSR 65-2083
Unclassified report

Availability: Published in Physical Review Letters, v14 n2 p39-41 11 Jan 1965. Copies to DDC users only.

Descriptors: (*Superfluidity, Vortices), (*Vortices, Quantum mechanics), (*Ions, Superfluidity), Helium, Liquefied gases, Cryogenics

The probability of capture and escape of ions by vortex lines are calculated for positive and negative ions having different radii but equal masses. The predictions are in qualitative agreement with observation. (Author)

AD-627 730 Fld. 20/13, 20/4, 20/10
CHICAGO UNIV ILL INST FOR THE STUDY OF METALS
CAPTURE CROSS SECTIONS FOR NEGATIVE IONS IN ROTATING HELIUM II,
by B. E. Springett, D. J. Tanner, and R. J. Donnelly. 23 Feb 65, 4p. Contract AF-AFOSR-785-65 ,NSF-GP-2693
AFOSR 65-2082
Unclassified report

Availability: Published in Physical Review Letters, v14 n15 p585-7 12 Apr 1965. Copies to DDC users only.

Descriptors: (*Superfluidity, Vortices), (*Vortices, Quantum mechanics), (*Ions, Superfluidity), Helium, Cryogenics

AD-627 731 Fld. 20/13, 20/4, 20/10
CHICAGO UNIV ILL INST FOR THE STUDY OF METALS
PHASE COHERENCE AND STABILITY OF HELIUM II IN NARROW CHANNELS,
by R. J. Donnelly. 12 Apr 65, 5p. Contract AF-AFOSR-785-65 ,NSF-GP-2693
AFOSR 65-2081
Unclassified report

Availability: Published in Physical Review Letters, v14 n23 p939-42 7 Jun 1965. Copies to DDC users only.

Descriptors: (*Superfluidity, Helium), Fluid flow, Reynolds number, Quantum mechanics, Superconductivity

AD-627 735 Fld. 20/13, 20/3
NORTH CAROLINA STATE UNIV RALEIGH DEPT OF MECHANICAL ENGINEERING
THEORY OF NONEQUILIBRIUM THERMODYNAMICS WITH APPLICATION TO THE TRANSPORT PROCESSES IN A SOLID,
by M. R. El Saden. 11 Mar 65, 7p. Contract AF-AFOSR-808-65 Proj. AF-9763 Task 976302
AFOSR 65-2086
Unclassified report

Availability: Published in The American Society of Mechanical Engineers, AIChE Heat Transfer Conference and Exhibit, Los Angeles, Calif. 8-11 Aug 1965. Copies to DDC users only.

Descriptors: (*Thermodynamics, Irreversible processes), (*Transport properties, Solids), (*Thermal conductivity, Electrical conductance), Heat transfer, Electric currents, Magnetic fields, Entropy, Thermoelectricity

The theory of nonequilibrium thermodynamics for inherently irreversible coupled processes is presented and the concept of heat is incorporated appropriately. The theory was applied to the problem of a solid carrying electric and heat currents in the presence of an external magnetic field. The principle of increase of entropy was employed to determine the reversibility or irreversibility of the macroscopic effects involved and to determine the limits on the material's properties. The dynamic equations show that, in the one-dimensional thermoelectric case, the heat current is not coupled to the electrical phenomenon. In two and three-dimensional cases, the heat current is coupled to the electrical phenomenon only through the influence of the external magnetic field. Areas of disagreement with the literature are pointed out and discussed. (Author)

AD-627 765 Fld. 20/13
CALIFORNIA UNIV LA JOLLA DEPT OF PHYSICS
INERTIAL MASS OF A MOVING FLUXOID,
by H. Suhl. 28 Dec 64, 4p. Contract AF-AFOSR-610-64
AFOSR 65-2541
Unclassified report

Availability: Published in Physical Review Letters v14 n7 p226-9 15 Feb 1965. Copies to DDC users only.

Descriptors: (*Superfluidity, Inertia), Oscillation, Relaxation time

AD-627 973 Fld. 20/13, 20/2, 20/4
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
PHONONS IN CRYSTALLINE SOLIDS AND DILUTE BOSE GASES.
Revised ed.,
by A. Bardasis, David S. Falk, and David A. Simkin. 8 Feb 65, 9p. Contract AF-AFOSR-735-65 Proj. AF-9761 Task 976101
AFOSR 65-2108

Unclassified report

Revision of manuscript submitted 14 Jan 65.

Availability: Published in Journal of Phys. Chem. Solids, v26 p1269-75 1965. Copies to DDC users only.

Descriptors: (*Phonons, Solids), (*Bosons, Gases), Potential energy, Kinetic energy, Excitation, Crystal lattices, Hamiltonian

Phonons in a crystalline solid and a dilute Bose gas are treated from a uniform point of view. In each of the cases, the potential is expanded about ionic (or atomic) 'equilibrium' positions, with the important difference that in the gaseous state these positions are allowed to move. This motion leads to an add ion term in the kinetic energy part of the gas Hamiltonian, resulting in a dispersion relation for long wavelength density fluctuations identical to that obtained by Bogoliubov. The usual lattice phonon spectrum is also reproduced. The limitations of the viewpoint when applied to liquids and Fermi gases are discussed. (Author)

AD-628 015 Fld. 20/13, 20/9
COLUMBIA UNIV NEW YORK
TRANSPORT PROPERTIES OF HYDROGEN.
Revised ed.,
by Dieter Brezing. 27 Apr 65, 8p. Contract AF49 (638)-1254 Proj. AF-9752
AFOSR 65-2494

Unclassified report

Revision of manuscript submitted 30 Sep 64.

Availability: Published in AIAA Journal p1422-7 Aug 1965. Copies to DDC users only.

Descriptors: (*Hydrogen, Transport properties), (*Transport properties, Hydrogen), Gases, Mixtures, Thermodynamics, Kinetic theory, Electrons, Ions, Electrons, Integrals, Viscosity, Thermal diffusion, Electrical properties, Thermoelectricity, Probability, Thermal conductivity

The transport properties of hydrogen were calculated for a pressure range from 0.000001 to 100 atm and at temperatures up to 1000000 K. The lower temperature limit is taken where the equilibrium gas mixture contains less than 1% molecular hydrogen. The Boltzmann formalism, which assumes binary collisions in the expressions for the transport properties of gas mixtures, is applied. Theoretical values, supported by experimental data whenever possible, are used for the atom-atom, atom-ion, and atom-electron collision cross sections. For Coulomb force interactions between charged particles, the Debye length is used as cutoff distance. The collision integrals for all interactions are computed. Values of viscosity, thermal, and electrical transport coefficients, as well as the thermoelectric coefficients, are presented. (Author)

AD-627 315 See Fld. 7/4

AD-627 380 See Fld. 20/12

AD-627 617 See Fld. 20/3

AD-627 780 See Fld. 8/10

AD-627 783 See Fld. 20/1

AD-627 798 See Fld. 20/4

20/14. WAVE PROPAGATION

AD-627 347 Fld. 20/14
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON DC
VALUES FOR SCATTERING BY DIELECTRIC SPHERES IN THE REGION OF THE FIRST RESONANCE.
Final rept.,
by W. C. Keller. 30 Dec 65, 39p. Rept. no. NRL-6365
Proj. SF-010-02-01-9296 ,SF-010-02-01-9300

Unclassified report

Descriptors: (*Spheres, Dielectric properties), Scattering, Electromagnetic waves, Intensity, High-temperature research, Polarization, Measurement, Resonant frequency

The scattering intensity as a function of sphere size in wavelengths was plotted for H-plane scattering at 90 degrees in the region of the first resonance. Graphs of K (the dielectric constant) from 5 to 24 and tan delta (the loss tangent) from 0.001 to 0.2 are presented for nonmagnetic spheres in vacuo. The purpose of these data is to serve as a comparison standard in evaluating K and tan delta by scattering measurements on a spherical sample. The experimental method is described in 'A Method of Determining the Dielectric Constant Applicable to High Temperatures,' published in the 'Proceedings of the OSU-RTD Electromagnetic Window Symposium,' Vol. III, June 1964. (Author)

AD-627 403 Fld. 20/14, 4/1
CFSTI Prices: HC $2.00 MF $0.50
RADIOLOCATION RESEARCH LAB UNIV OF ILLINOIS URBANA
A PROGRAM FOR COMPUTING THE IONOSPHERE TILT ANGLES FROM THE RADIO RAY ARRIVAL ANGLES.
Technical note,
by David G. Detert, and Roger A. Vossler. Jan 66, 28p. Rept. no. TN-39, RRL-Pub-287

Unclassified report

Research supported in part by AERDL, NONR, BUSHIPS and RADC.

Descriptors: (*Radio waves, Ionospheric propagation), (*Ionosphere, Electromagnetic wave reflection), (*Atmospheric sounding, Radio waves), Angle of arrival, Direction finding, Distance-measuring equipment, Radio equipment, Programming (Computers), Data processing systems

From the distance between the transmitting and receiving stations, the height of the radio ray reflection, and the arrival angles of the radio ray at the receiver, this program will determine the attitude of the tilt vector of the ionosphere at the point of reflection of a single-hop propagation path. In addition the perpendicular deviation for the transmitter-receiver great circle bearing to a point directly under the point of the reflection is also computed. In order to establish a suitable model of the problem, it is assumed that: (a) The propagation path is represented by its Martyn equivalent; (b) the ionosphere is a plane mirror at the point of the reflection; (c) the earth is a sphere with a radius of 6371.22 kilometers. This program is coded in FORTRAN. The computer involved in this case is a Control Data Corporation G-20 using the SPACE programming system. (Author)

AD-627 439 Fld. 20/14, 8/3, 4/2
CFSTI Prices: HC $6.00 MF $1.25
ELECTRICAL ENGINEERING RESEARCH LAB UNIV OF TEXAS AUSTIN
SUPPLEMENTARY DATA REPORT FOR 1955 GULF OF MEXICO PROPAGATION TESTS,
by F. E. Brooks,Jr., N. K. Wagner, and J. R. Gerhardt. 31 Mar 57, 234p. Rept. no. EERL-3-20
Contract NOrd-16498

Unclassified report

Johns Hopkins Univ., Silver Spring, Md., rept. no. TG-260A.

Descriptors: (*Radio waves, Propagation), (*Mexico Gulf, Radio transmission), Meteorological parameters, Oceanographic data

AD-627 538 Fld. 20/14, 17/9, 4/1
CFSTI Prices: HC $1.00 MF $0.50
HOLMAN (JOHN F) CO INC WASHINGTON DC
EFFECT OF METEOROLOGICAL FACTORS DURING RADAR MEASUREMENTS,
by O. A. Mozzhukhin. Feb 66, 8p. Rept. no. T-1818-65
Contract DA-44-009-AMC-930 (T) Proj. DA-4-A-623-501-A-852
TT 66-60452

Unclassified report

Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Geodeziya i Aerofotosemka (USSR) n3 p27-31 1964.

Descriptors: (*Radar interference, Atmospheric refraction), (*Atmospheric refraction, Radar interference), Atmosphere, Refractive index, Meteorological parameter, Radar scanning, Errors, Distance-measuring equipment, USSR

The basic source of errors in high frequency radar measurements due to meteorological factors is identification of the refraction index n sub av obtained as the average value of measurements made at the end of the line with its true value n, which is characteristic for the entire measured line at the level of radio beam transmission. The error depends first on the value of the vertical gradient of the refraction index within the layer of atmosphere where the radio waves are propagated during radio geodetic measurements. If the law is known for the variation in the refraction index with altitude and the average height of radio beam h over the base surface (for example, by taking measurements from a topographical chart); an attempt can be made to reduce the index of refraction measured close to the surface of the Earth to the altitude h and thereby to correct the measured radar distance. To clarify the question of variation in the refraction index with altitude, experimental data on the temperature and humidity of air at four altitudes in a layer extending to 106 m over an open, level region were processed.

AD-627 603 Fld. 20/14, 4/2, 8/10
CFSTI Prices: HC $4.00 MF $0.75
ELECTRICAL ENGINEERING RESEARCH LAB UNIV OF TEXAS AUSTIN
RADIO RESULTS FOR 1955 GULF OF MEXICO PROPAGATION TESTS.
Final rept.,
by F. E. Brooks,Jr., 31 Mar 57, 101p. Rept. no. CM-894 ,EERL-3-21
Contract NOrd-16498

Unclassified report

Descriptors: (*Radio waves, Propagation), (*Mexico Gulf, Radio transmission), Seas, Surface properties, Electromagnetic wave reflections, Meteorological parameters, Oceanographic data, Radio equipment

During late spring of 1955 field measurements of the overwater propagation of microwaves at low elevation angles were conducted. These tests were designed to substantiate a phenomenological model for low angle propagation and to determine experimentally the parameters of the model. Measurements were made at 5.3-cm, 3.2-cm, and 8.6-

mm wave lengths with various antenna systems to produce various degrees of illumination on the water surface. Meterological and oceanographic data were also obtained for correlation with the radio data. (Author)

AD-627 604 Fld. 20/14, 4/2, 8/10
CFSTI Prices: HC $3.00 MF $0.75
ELECTRICAL ENGINEERING RESEARCH LAB UNIV OF TEXAS AUSTIN
METEOROLOGICAL AND OCEANOGRAPHIC RESULTS FOR THE 1955 GULF OF MEXICO PROPAGATION TESTS.
Final rept.,
by N. K. Wagner, and J. R. Gerhardt. 31 Mar 57, 83p. Rept. no. CM-895 ,EERL-3-22
Contract NOrd-16498

Unclassified report

See also AD-627 603.

Descriptors: (*Radio waves, Propagation), (*Mexico Gulf, Radio transmission), Seas, Surface properties, Electromagnetic wave reflections, Meteorological parameters, Oceanographic data, Radio equipment, Meteorological instruments, Oceanographic equipment

In the spring of 1955 an over water measurement program was conducted about thirty miles off the coast of Louisiana on two oil drilling platforms in the Gulf of Mexico. A series of micrometeorological and oceanographic measurements was taken in conjunction with radio propagation tests. The program was designed so that the resulting meteorological data would; (1) help the radio engineer to determine which atmospheric and sea surface variables affect the reflection of radio signals, and (2) be of interest from a strictly micrometeorological standpoint. Meteorological data were obtained with a number of instruments ranging from standard threecup anemometers to the Crain microwave refractometer. Gulf wave heights were measured with a step gage, while the longer period variations were obtained by means of a surf beat gage designed and built at the Applied Physics Laboratory of Johns Hopkins University. This report presents the analysis of the meteorological and oceanographic data along with a description of the instrumentation. (Author)

AD-627 619 Fld. 20/14
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
ANALYTICAL LINE SHAPES FOR LORENTZIAN SIGNALS BROADENED BY MODULATION,
by Rolf Arndt. 4 Mar 65, 3p. Contract AF49 (638)-1468 Proj. AF-9764
AFOSR 65-2026

Unclassified report

Availability: Published in Journal of Applied Physics, v36 n8 p2522-2 Aug 1965. Copies to DDC users only.

Descriptors: (*Modulation, Magnetic resonance), (*Harmonic analysis, Modulation), Signals, Fourier analysis, Nuclear magnetic resonance, Paramagnetic resonance

General analytical expressions are given for the line shapes of Lorentzian signals broadened by modulation. The results are discussed for the cases of the first and second harmonic. The linewidths and the signal intensities have been calculated analytically as a function of the modulation amplitude. (Author)

AD-627 635 Fld. 20/14, 17/9, 9/3
CFSTI Prices: HC $3.00 MF $0.75
LINCOLN LAB MASS INST OF TECH LEXINGTON
INFLUENCE OF THE EARTH'S SURFACE ON RADAR,
by Nathaniel I. Durlach. 18 Jan 65, 77p. Rept. no. TR-373
Contract AF19 (628)-500 ,AF19 (628)-5167 Proj. AF-649L
ESD TDR-65-32

Unclassified report

Descriptors: (*Radar interference, Earth (Planet)), (*Earth (Planet), Radar interference), Surface properties, Radar reflections, Radar clutter, Reduction, Radar pulses, Propagation, Airborne, Experimental design,

This report provides radar designers with background information on how the idealized free-space radar theory must be modified to take account of reflections from the earth's surface. It is primarily concerned with problems that arise in designing systems that are airborne and contains discussions of the following topics: effects of reflections from the earth on the signal received from an elevated target, implications of these effects for detection and parameter estimation, effects of surface roughness, techniques for the reduction of clutter, scattering from the ocean, and spherical-earth geometry. (Author)

AD-627 675 Fld. 20/14, 4/1
CFSTI Prices: HC $3.00 MF $0.75
ITT FEDERAL ELECTRIC CORP PARAMUS N J
DEVELOPMENT OF A PROCEDURE FOR OBTAINING A PREDICTED MEASUREMENT OF THE ELECTROMAGNETIC ENVIRONMENT AT A SITE.
Final engineering rept. for 17 Mar-15 Jun 65. 15 Jun 65, 64p. Contract NObsr-91236 Proj. SF-131504 Task 7876

Unclassified report

Descriptors: (*Radiofrequency interference, Meteorological parameters), (*Radio waves, Propagation), Signal-to-noise ratio, Radio reception, Site selection, Atmospherics, Correlation techniques

The objective of the study was to develop a technique for obtaining a predicted measurement of the electromagnetic environment at a site, based on limited measurements taken over a relatively short calendar interval. A literature search was performed to uncover information which would be useful in the development of such a technique. Weather data and signal intensity data on a wide range of frequencies were collected at Lincoln Park, New Jersey, during the interval 7 August 1964 through 11 September 1964 and the interval 12 January 1965 through 5 February 1965. These data, expected to be important in the development of the technique, formed the basis for conducting analyses to develop useful relationships between variations in signal intensity and other parameters, such as, temperature, humidity, refractive index, and time of day.

AD-627 903 Fld. 20/14
CFSTI Prices: HC $4.00 MF $1.00
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
HIGH RESOLUTION RADIO FREQUENCY MEASUREMENTS OF FARADAY ROTATION AND DIFFERENTIAL ABSORPTION WITH ROCKET PROBES,
by Howard W. Knoebel, Dominic O. Skaperdas, Jay D. Gooch, Bill D. Kirkwood, and Henry V. Krone. Dec 65, 138p. Rept. no. R-273
Contract DA-28-043-AMC-0073 (E) ,NsG-504
Proj. DA-20014501B31F

Unclassified report

Descriptors: (*Ionospheric propagation, Magneto-optic effect), (*Magneto-optic effect, Ionospheric propagation), Ionosphere, Radio waves, Absorption, Measurement, Test methods, Sounding rockets, Electron density, Data processing systems, Theory, Telemeter system, Instrumentation, Antennas, Wiring diagrams

A highly essential system for lower ionosphere radio propagation measurements, using probe rockets, developed by the Coordinated Science Laboratory, is described in detail. Unique features include: (1) feedback around a closed loop consisting of the rocket and ground stations employed in a null-seeking technique, which increased absorption measurement accuracy and (2) artificial rotation of the ground based antenna which extends the range over which Faraday rotation can be resolved from layer reflection phenomena. The rocket borne and ground station equipment has been shown to work reliably during a series of 14 rocket measurements made from both land-based facilities and the NASA seagoing mobile launch platform during the International Quiet Sun Years. Complete engineering information is given in the hope that other investigators may easily duplicate the measurements. Data processing techniques for smoothing and improving the accuracy as well as some typical data are described.

AD-627 399 **See Fld. 9/2**

AD-627 405 **See Fld. 20/6**

AD-627 480 **See Fld. 20/9**

AD-627 615 **See Fld. 17/9**

AD-627 713 **See Fld. 20/3**

AD-627 722 **See Fld. 17/7**

Field 21-PROPULSION AND FUELS

21/2. COMBUSTION AND IGNITION

AD-627 409 Fld. 21/2, 21/7
CFSTI Prices: HC $2.00 MF $0.50
CALIFORNIA UNIV BERKELEY DEPT OF MECHANICAL ENGINEERING
FLAME PROPAGATION RATES IN THE COMBUSTION OF AMMONIA.
Technical rept.,
by G. S. Samuelsen. 9 Sep 65, 47p. Rept. no. TS-65-4 ,TR-5
Contract DA-04-200-AMC 791 (X)

Unclassified report

Descriptors: (*Ammonia, Combustion), (*Flames, Propagation), (*Alkanes, Combustion), Spark ignition engines, Pressure, Dissociation

An investigation was made of the flame propagation rates and peak pressures of ammonia as compared to iso-octane in spark ignition engine combustion. The influence of compression ratio, speed, manifold pressure, and dissociation of ammonia prior to combustion was studied as a function of equivalence ratio (phi). The ammonia kernel development proved to be 1.4 times greater than the 2.72 millisecond average recorded with iso-octane. The maximum ammonia flame rate was 59 fps at phi = 0.85 and, for iso-octane, 83 fps at phi = 1.23. While the propagation rates of iso-octane fell uniformly on either side of maximum, the ammonia flame rates dropped rapidly on the rich side of maximum through an inflection point. Prior partial dissociation of ammonia, before introduction to the engine, was found to be of prime importance to flame speeds, becoming more critical for leaner mixtures. (Author)

AD-627 410 Fld. 21/2, 7/4
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
FLAME INHIBITION RESEARCH.
Quarterly progress rept. for 1 Feb-30 Apr 62,
by R. M. Fristrom, W. G. Berl, W. E. Wilson, J. T. O'Donovan, and S. Favin. Apr 62, 31p. Rept. no. TG-376-6
Contract NOw-62-0604-c

Unclassified report

See also AD-278 058.

Descriptors: (*Flames, Inhibition), (*Reaction kinetics, Flames), Combustion, Halogenated hydrocarbons, Bromine, Methane, Free radicals

The spherical flame was operated under maximum pressure and flow conditions in an effort to circumvent the wall cooling problems previously reported. Studies of this flame indicated that the adiabadic temperature maximum was attained but that 0 atom concentration remained out of equilibrium. It was concluded that the solution to the problem was either an increase in flask size or the use of a Flat Flame; therefore, an all glass, ceramic, and Teflon burner has been constructed and tested. The system employs a flat flame burner and the sampling system has been designed so that temperatures can be measured using the pneumatic probe technique; and provision has been made to determine radical concentrations using the scavenger sampling probe technique. The scavenger sampling probe technique for oxygen atoms has been compared with gas phase titration in an electric discharge. The two techniques agreed very well, provided certain precautions are taken. Some limitations of the gas phase titration technique are discussed. (Author)

AD-627 441 Fld. 21/2, 20/1, 20/11
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
EFFECT OF SOLID PROPELLANT COMPRESSIBILITY ON COMBUSTION STABILITY,
by J. F. Bird, L. Haar, R. W. Hart, and F. T. McClure. Aug 59, 27p. Rept. no. TG-335-1
Contract NOrd-7386

Unclassified report

Descriptors: (*Solid rocket propellants, Compressive properties), (*Compressive properties, Combustion), (*Combustion, Stability), Acoustic properties, Elasticity, Thermal expansion

The recent theory of the interaction of sound with a burning propellant surface is extended to include density fluctuations of the solid propellant. Both compressibility and thermal expansion are treated, but the latter is found to be less important than the former. For reasonable values of the compressibility, it is shown that the acoustic response of the surface is reduced by as much as 0.1 in a broad range of frequency around several kilocycles per second. A simple low frequency approximation for the burning surface response is also discussed. (Author)

AD-627 450 Fld. 21/2, 7/4
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
FLAME INHIBITION RESEARCH.
Quarterly progress rept. 1 Nov 62-31 Jan 63. Feb 63, 40p. Rept. no. TG-376-9
Contract NOw-62-0604-c Proj. DA-8M76-05-001-03

Unclassified report

See also AD-294 601.

Descriptors: (*Flames, Inhibition), (*Reaction kinetics, Flames), Combustion, Halogentated hydrocarbons, Bromine, Methane, Molecular structure

The research this quarter centered around flame structure studies, flame inhibition theory, and elementary reaction studies.

AD-627 397 **See Fld. 21/9**

AD-627 401 **See Fld. 21/9**

AD-627 415 **See Fld. 21/8**

AD-627 421 **See Fld. 13/12**

AD-627 491 **See Fld. 21/9**

AD-627 495 **See Fld. 21/8**

AD-627 712 **See Fld. 21/9**

AD-628 014 **See Fld. 21/8**

21/5. JET AND GAS TURBINE ENGINES

AD-627 369 **See Fld. 1/3**

AD-627 428 **See Fld. 20/4**

AD-628 011 **See Fld. 14/1**

21/6. NUCLEAR PROPULSION

AD-627 670 Fld. 21/6, 18/8, 14/2
CFSTI Prices: HC $3.00 MF $0.75
GENERAL DYNAMICS/FORT WORTH TEX NUCLEAR AEROSPACE RESEARCH FACILITY
NERVA COMPONENTS IRRADIATION PROGRAM. VOLUME III. GTR TEST 13,
by E. E. Chappell, J. W. Evans, E. E. Palmer, L. P. Stuart, and W. D. McMillan. 13 Sep 64, 91p. Rept. no. FZK-184-3
Contract AF29 (601)-6213

Unclassified report

Descriptors: (*Nuclear propulsion, Instrumentation), (*Rocket components, Radiation damage), (*Radiation damage, Rocket components), Rocket motors, Strain gages, Thermocouples, Ceramic materials, Piezoelectric transducers, Rocket components, Boron alloys, Aluminum alloys, Instrumentation

The tenth in the series of irradiation tests using the Ground Test Reactor at the Nuclear Aerospace Facility (NARF) to determine the effects of reactor radiation on candidate NERVA engine components was concluded on 12 June 1964. The items in the test, designated GTR-13, include strain gages, thermocouples, a control drum plate section, and piezoelectric ceramic discs.

21/7. RECIPROCATING ENGINES

AD-627 409 **See Fld. 21/2**

21/8. ROCKET MOTORS AND ENGINES

AD-627 495 Fld. 21/8, 21/2
PURDUE UNIV LAFAYETTE IND SCHOOL OF MECHANICAL ENGINEERING
STABILITY CRITERIA FOR LONGITUDINAL PRESSURE OSCILLATIONS IN A ROCKET MOTOR,
by S. N. B. Murthy, and J. R. Osborn. 4 Jan 65, 7p. Contract AF-AFOSR-753-65
AFOSR 65-2078

Unclassified report

Availability: Published in The Journal of Accoustical Society of America v37 n5 p872-8 May 1965. Copies to DDC users only.

Descriptors: (*Rocket motors, Oscillation), (*Combustion, Stability), Pressure, Acoustic properties, Combustion chambers, Flames, Rocket motor nozzles, Design, Equations

The problem called 'high-frequency combustion instability in rocket motors' has been considered to be one in which the acoustics of the combustion chamber, nozzle, and flame front are significant for determining whether or not a motor will experience pressure oscillations of an acoustic type. To date, no theory has been developed for demonstrating the effects of the location and width of the flame front in the combustion chamber upon the occurrence of pressure oscillations of the longitudinal mode. In the paper, the rocket motor is treated as a constant-diameter duct with a finite width of combustion zone located between two uniform regions. It also is considered to have finite wave-transmission coefficients at the nozzle and the injector ends. For these conditions, stability criteria are established for the longitudinal mode of pressure oscillations. It is shown that, while the energy release rate per unit width of the combustion zone is significant in determining whether the motor will be stable, the location of the combustion zone in the motor, the over-all length of the motor, and the total amount of energy released also influence the stability of the motor in the longitudinal mode. (Author)

AD-627 519 **See Fld. 11/4**

21/8.1 LIQUID ROCKET MOTORS

AD-628 014 Fld. 21/8.1, 21/2
CFSTI Prices: HC $1.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y
HIGH-FREQUENCY COMBUSTION INSTABILITY AND SCALING OF LIQUID PROPELLANT ROCKET MOTORS,
by Vito D. Agosta, Sanford S. Hammer, and William T. Peschke. 1966, 15p. Contract AF49 (638)-1263
AFOSR 65-2501

Unclassified report

Descriptors: (*Rocket motors (Liquid propellant), Oscillation), Combustion, Acoustics, Scale, Bipropellants, Drops, Ballistics, Propagation, Evaporation

The following theoretical and experimental programs are in progress which are related to the instability and scaling problems in rocket motors: A steady-state aero-thermo-chemical analysis for a liquid bipropellant rocket motor with small contraction ratio employing droplet ballistics for both fuel and oxidizer. A non-linear wave propagation analysis in a droplet burning heterogeneous combustion field. A non-steady droplet evaporation analysis and concomitant experimental verification. The paper includes the experimental results obtained thus far from investigating the oscillatory behavior of the 500 lbm thrust JP5-Lox rocket motor. (Author)

AD-627 712 **See Fld. 21/9**

21/8.2 SOLID ROCKET MOTORS

AD-627 415 Fld. 21/8.2, 21/2, 21/9
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
COMBUSTION-INDUCED OSCILLATIONS IN SOLID PROPELLANT ROCKET ENGINES,
by W. G. Berl. Jul 63, 36p. Rept. no. TG-371-6
Contract NOw-62-0604-c

Unclassified report

Talk given at the AFOSR Contractors' Meeting on Liquid Rocket Combustion Research (16th), June 25-28, 1963, Nantucket Island, Massachusetts.

Descriptors: (*Rocket motors (Solid propellant), Oscillation), (*Combustion, Stability), (*Solid rocket propellants, Combustion), Symposia, Acoustics, Very low frequency, Deflagration, Detonations

The report is almost wholly devoted to a discussion of combustion instability problems in rocket engines.

AD-627 613 Fld. 21/8.2, 16/1
CFSTI Prices: HC $2.00 MF $0.50
UNITED TECHNOLOGY CENTER SUNNYVALE CALIF
RELIABILITY AND QUALITY ASSURANCE PROGRAM; STATUS REPORT (QUARTERLY).
Quarterly rept. no. 13, Oct-Dec 65.
8 Feb 66, 27p. Rept. no. ER-UTC-66-1
Contract AF04 (695)-156
Unclassified report

Descriptors: (*Rocket motors (Solid propellant), Reliability), (*Launch vehicles (Aerospace), Rocket motors (Solid propellant)), Quality control, Design, Malfunctions, Failure (Mechanics), Thrust vector control systems

21/9. ROCKET PROPELLANTS

AD-627 978 Fld. 21/9, 7/4
CFSTI Prices: HC $2.00 MF $0.50
ASTROSYSTEMS INTERNATIONAL INC FAIRFIELD N J
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH ANNUAL CONTRACTOR'S MEETING ON CHEMICAL KINETICS OF PROPULSION (6TH), 20-21 SEPTEMBER 1965.
Agenda and abstracts.
21 Sep 65, 46p. Contract AF49 (638)-1400 Proj. AF-9750 Task 975001
AFOSR 65-2238
Unclassified report

Descriptors: (*Rocket propellants, Reaction kinetics), (*Reaction kinetics, Rocket propellants), Combustion, Flames, Symposia, Abstracts

AD-627 415 **See Fld. 21/8**

AD-627 656 **See Fld. 7/4**

21/9.1 LIQUID ROCKET PROPELLANTS

AD-627 343 Fld. 21/9.1
CFSTI Prices: HC $3.00 MF $0.75
ROCKETDYNE CANOGA PARK CALIF
COMBUSTION STABILITY RATING TECHNIQUES.
Quarterly progress rept. no. 2 for 30 Dec 55,
by L. P. Combs, J. A. Murphy, E. E. Lockwood, F. W. Hoehn, and M. Alexander. Jan 66, 79p.
Rept. no. R-6355-2
Contract AF04 (611)-10811 Proj. AF-3058
Unclassified report

Descriptors: (*Liquid rocket propellants, Combustion), (*Combustion, Stability), Gas flow, Test equipment, Airburst, Data, Tests, Explosive materials, Flow visualization

Work conducted on a study of liquid-propellant rocket combustion stability rating techniques is reported. Experimental tests were made for cold-flow characterization of three rating methods: non-directional explosive bombs, directed blasts from explosive pulse guns, and directed flows of gases. Data relating the output characteristics of the method to particular design and input parameters are presented. Cold-flow characteristics are to be correlated with stability response of a rocket combustor when the techniques are applied during hot firings. Motor hardware and test stand preparations for the hot-firing program are described. (Author)

AD-627 712 Fld. 21/9.1, 21/8.1, 21/2
CFSTI Prices: HC $1.00 MF $0.50
PRINCETON UNIV N J DEPT OF AEROSPACE AND MECHANICAL SCIENCES
COMBUSTION PROCESSES IN LIQUID PROPELLANT ROCKET MOTORS.
Final rept. 1 Sep 62-31 Aug 63,
by Irvin Glassman. 22 Dec 65, 12p. Contract AF-AFOSR-111-63
Unclassified report

Descriptors: (*Rocket motors (Liquid propellant), Combustion), (*Combustion, Liquid rocket propellants), Stability, Combustion gases, Catalysts, Dimethyl hydrazine (1-1), Hydrazine

Princeton University has been engaged in a long range program on combustion processes in liquid propellant rocket motors. Aspects of this program are still continuing. During the period of 1 September 1962 to August 63, the work was supported by Air Force Office of Scientific Research Grant 111-63. The detailed technical accomplishments have been published in the open literature as listed in the section on publications. The report reviews the history, results, and publications of the research program up to 31 August.

AD-627 787 **See Fld. 7/2**

21/9.2 SOLID ROCKET PROPELLANTS

AD-627 397 Fld. 21/9.2, 21/2
CFSTI Prices: HC $6.00 MF $1.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
PROCEEDINGS OF THE MEETING, TECHNICAL PANEL ON SOLID PROPELLANT COMBUSTION INSTABILITY (3RD) HELD AT THE APPLIED PHYSICS LABORATORY, SILVER SPRING, MARYLAND, MARCH 4 AND 5, 1963.
May 63, 290p. Rept. no. TG-371-5
Contract NOw-62-0604
Unclassified report

Descriptors: (*Solid rocket propellants, Combustion), (*Combustion, Stability), Acoustics, Rocket motors (Solid propellant), Fluid flow, Oscillation, Ballistics, Viscoelasticity, Test equipment, Symposia

Thirty-four papers (in various states of condensation) dealing with combustion instability problems are presented. Topics include measurements of acoustic admittance, nonlinear and nonresonant instabilities, fluid dynamics of the flow process, interaction of oscillation with the ballistic properties of a propellant, viscoelastic properties, etc.

AD-627 401 Fld. 21/9.2, 21/2
CFSTI Prices: HC $4.00 MF $0.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
PROCEEDINGS OF THE MEETING, TECHNICAL PANEL ON SOLID PROPELLANT COMBUSTION INSTABILITY (4TH) HELD AT STANFORD RESEARCH INSTITUTE, MENLO PARK, CALIF. FEBRUARY 1, 1964.
Apr 64, 111p. Rept. no. TG-371-7
Contract NOw-62-0604-c
Unclassified report

Descriptors: (*Solid rocket propellants, Combustion), (*Combustion, Stability), Acoustics, Erosive burning, Oscillation, Rocket motors (Solid propellant), Liquid rocket propellants, Symposia

The paper, Experimental measurements of acoustic erosivity effects on propellant burning rates, by R. C. Strittmater, W. P. Aungst, C. E. Thompson and L. A. Watermeier, is given in its entirety. In addition, condensed versions of the following papers are included: Problems in liquid propellant instability; Liquid instability problems; An experimental study of solid propellant combustion instability in a standing wave tube; Basic physical processes of solid propellant combustion; Shock wave -- burning solid propellant interaction; Acoustic absorption coefficients of the combustion products of aluminized propellants; Further development of 'Stability grading of solid propellants by the oscillatory strand burner test'; An interpretive study of unstable rocket combustion data and method for the simulation of such data; Work at Summerfield Research Station and the University of Sheffield, England; Influence of compositional factors on axial instability; Influence of axial combustion instability on the development of a 23KS20000 motor; Progress in research on combustion instability of solid propellants at the University of Utah; Low frequency acoustic instability studies with double base propellants; Bulk compressibility of solid propellants; Solution of transient vibration problems by separation of variables.

AD-627 491 Fld. 21/9.2, 21/2
CFSTI Prices: HC $4.00 MF $1.00
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
UNCLASSIFIED PROCEEDINGS OF THE MEETINGS, TECHNICAL PANEL ON SOLID PROPELLANT COMBUSTION INSTABILITY (2ND) HELD AT STANFORD RESEARCH INSTITUTE, MENLO, PARK, CALIFORNIA, MARCH 8 AND 9, 1962.
May 62, 145p. Rept. no. TG-371-4B
Contract NOw-62-0604-c
Unclassified report

Descriptors: (*Solid rocket propellants, Combustion), (*Combustion, Stability), Oscillation, Acoustic properties, Sound, Scattering, Flames, Symposia, Rocket motors (Solid propellant), Detonations

Twenty-three papers are presented on solid propellant combustion instability.

AD-627 641 Fld. 21/9.2
CFSTI Prices: HC $3.00 MF $0.75
COLUMBIA UNIV NEW YORK DEPT OF CIVIL ENGINEERING AND ENGINEERING MECHANICS
DEFORMATION AND FAILURE ANALYSIS OF REINFORCED GRAIN.
Technical rept.,
by A. M. Freudenthal. Jun 65, 60p. Rept. no. TR-28
Contract Nonr-266 (78) Proj. NR-064-446
Unclassified report

Descriptors: (*Propellant grains, Mechanical properties), (*Solid rocket propellants, Mechanical properties), Deformation, Failure (Mechanics), Analysis, Design, Viscoelasticity, Solid rocket propellant binders, Reinforcing materials, Elastomers, Composite materials

After considering the limitations imposed by the characteristic response of filled elastomers on the performance of case-bonded solid propellant grains, particularly the effect of loss of filler-binder interaction with increasing strain, the significant features of metal-wire of mesh-reinforced grains are discussed. The difference between the design criteria for such grains and for other types of reinforced structures is emphasized and the inapplicability of classical methods of visco -elastic analysis is discussed. Methods of analysis of elastic orthotropic, inhomogeneous, case bonded grains are summarized and their limitations shown with respect to optimal utilization of the reinforcement. Such utilization requires thickness of the grain and the consideration of its elastic-plastic response in grain analysis. (Author)

AD-628 035 Fld. 21/9.2
CFSTI Prices: HC $3.00 MF $0.75
ATLANTIC RESEARCH CORP ALEXANDRIA VA KINETICS AND COMBUSTION GROUP
RESEARCH ON DEFLAGRATION OF HIGH-ENERGY SOLID OXIDIZERS.
Final technical rept. 1 Jun 62-30 Nov 65,
by J. B. Levy, G. von Elbe, R. Friedman, E. T. McHale, and S. J. Adams. 30 Nov 65, 60p. Contract AF49 (638)-1169 Proj. AF-9713 Task 971301
AFOSR 66-0157
Unclassified report

Descriptors: (*Solid rocket oxidizers, Deflagration), (*Deflagration, Solid rocket oxidizers), (*Hydrazine derivatives, Deflagration), Perchlorates, Decomposition, Catalysts, Flames, Temperature, Quenching (Inhibition), Vaporization, Combustion

The results of research on the deflagration of the solid-propellant oxidizers, hydrazine perchlorate (HP) and hydrazine diperchlorate (HDP), are reported and discussed. Each compound was found to be unique physically and chemically, in both its low-temperature thermal decomposition and its high-temperature deflagration behavior. HP and HDP are white solids of crystal densities 1.939 and 2.21 g/cc, and melting points of 141 and 191C, respectively. The following aspects of the combustion process were studied: The deflagration rate as a function of pressure and the effects of catalysts; the flame temperature and the temperature profile through the combustion wave; quenching, thermal decomposition, and chemical behavior. In addition, vaporization rates of HP were measured. (Author)

Field 22-SPACE TECHNOLOGY

22/1. ASTRONAUTICS

AD-627 587 Fld. 22/1, 3/2, 5/1
CFSTI Prices: HC $6.00 MF $1.25
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
COSMIC RESEARCH, VOLUME 3, NUMBER 5, 1965.
20 Jan 66, 237p. Rept. no. FTD-TT-65-1702
TT 66-60453

Unclassified report

Unedited rough draft trans. of Kosmicheskie Issledovaniya (USSR) v3 n5 p667-809 1965.

Descriptors: (*Astronautics, Scientific research), (*Astrophysics, Scientific research), Rotation, Satellites (Artificial), Moments, Mathematical analysis, Circular orbit trajectories, Elliptical orbit trajectories, Oscillations, Stabilization systems, Perturbation, N-body problem, Series, Terresterial magnetism, Plasma physics, Solar radiation, Solar flares, Wave propagation, Mass spectroscopy, Spectrum analyzers, Radiofrequency, Space environmental conditions, Shielding, Astronauts, Radiation effects, Spacebiology, Acceleration, USSR

AD-627 686 Fld. 22/1, 6/19, 6/11
CFSTI Prices: HC $9.40 MF $2.50
SOUTHWEST RESEARCH INST SAN ANTONIO TEX
BIOASTRONAUTICS AND THE EXPLORATION OF SPACE,
by Theodore C. Bedwell,Jr., and Hubertus Strughold. Dec 65, 639p. Contract AF41 (609)-2293

Unclassified report

Proceedings of International Symposium (3rd), San Antonio, Tex. 16-18 Nov 64.

Descriptors: (*Astronautics, Symposia), (*Space environmental conditions, Symposia), (*Space flight, Symposia), Space probes, Space medicine, Space biology, Astrophysics, Meteors, Planetary atmospheres, Mars (Planet), Venus (Planet), Lunar probes, Extraterrestrial bases, Interplanetary trajectories, Aerial photography, Vision, Spacecraft cabins, Closed ecological systems, Life support, Programming (Computers), Helium group gases, Ear, Weightlessness, Adaptation (Physiology), Man-machine systems, Radiobiology, Cosmic rays, Radiation effects, Skin, USSR, Protons, Rhythm (Biology), Animals, Space stations, Orbital trajectories, Astronauts, Performance (Human)

The symposium is focused on manned space flight, and is primarily concerned with the life and the performance capability of the astronauts. The program of the conference is not confined to the life sciences alone but examines the 'space environment-man-machine' complex, and includes a discussion of technology, astrophysics, and astronomy, earth-based and space -bound.

AD-627 854 Fld. 22/1
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
SCIENTISTS' LABORATORY IN SPACE,
by O. Shebalin. 5 Nov 65, 7p. Rept. no. FTD-TT-65-709
TT 66-60483

Unclassified report

Unedited rough draft trans. of Tekhnika Molodezhi (USSR) v32 n11 p21 1964.

Descriptors: (*Space flight, USSR), Reviews, Astronautics, Astronauts, Spacecraft

A generalized discussion is presented of some Russian accomplishments in space flight.

AD-627 431 **See Fld. 20/3**

AD-627 605 **See Fld. 18/8**

22/2. SPACECRAFT

AD-627 600 Fld. 22/2
CFSTI Prices: HC $2.00 MF $0.50
LINCOLN LAB MASS INST OF TECH LEXINGTON
DESIGN OF ELECTROMAGNETIC TORQUE RODS.
Technical note,
by William L. Black. 21 Dec 65, 41p. Rept. no. TN-1965-45
Contract AF49 (628)-5167 Proj. AF-649L
ESD TDR-65-589

Unclassified report

Descriptors: (*Satellites (Artificial), Stabilization systems), Electromagnets, Torque, Rods, Spin stabilization, Synchros

This report is a compilation of considerations involved in the design of electro-magnetic rods for satellite erection. Formulae are derived showing the effect of various choices of core and wire material and weight, number of cores, length of cores, number of turns per core, and wire area on the magnetic moment, hysteresis power, hold power, hold voltage, and switching time. These formulae are then applied to the problem of producing a required magnetic moment at the least cost in weight and power consumption. (Author)

AD-627 602 Fld. 22/2, 14/4
CFSTI Prices: HC $3.00 MF $0.75
RAND CORP SANTA MONICA CALIF
THE EFFECT OF MAINTAINABILITY ON THE MISSION RELIABILITY OF TWO-ELEMENT REDUNDANT SPACECRAFT SUBSYSTEMS.
by C. G. Vandervoort. Dec 65, 61p. Rept. no. RM-4824-PR
Contract AF49 (638)-1700

Unclassified report

Descriptors: (*Spacecraft components, Reliability), (*Redundant components, Maintainability), Design, Malfunctions

The memorandum presents a technique that will assist the designer in assessing the effect of maintenance on the reliability of spacecraft systems with two-element redundancy, i.e., where the prime system element is backed up by a redundant secondary.

AD-627 357 **See Fld. 17/2**

AD-627 442 **See Fld. 4/2**

AD-627 452 **See Fld. 17/2**

AD-627 515 **See Fld. 6/3**

AD-627 660 **See Fld. 3/2**

AD-627 743 **See Fld. 20/4**

AD-627 993 **See Fld. 9/5**

22/3. SPACECRAFT TRAJECTORIES AND REENTRY

AD-627 344 Fld. 22/3, 9/2
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON DC
LOOK-ANGLE-PREDICTION TECHNIQUE FOR ARTIFICIAL EARTH SATELLITES.
Interim rept.,
by J. A. Buisson,III, and H. G. DeVezin,Jr.. 30 Dec 65, 45p. Rept. no. NRL-6351
Proj. RT-7043014/652-1/F019-03-03

Unclassified report

Descriptors: (*Satellite tracking systems, Programming (Computers)), (*Programming (Computers), Satellite tracking systems), Satellites (Artificial), Orbital trajectories, Position finding, Numerical methods and procedures, Digital computers, Programming languages, Space surveillance systems

This report is concerned with the investigation of a method for obtaining look-angle predictions for artificial earth satellites relative to a given point on the earth. The input to the problem consists of the most-recently -determined elliptical orbital elements of the satellite, the spherical coordinates of a station on the earth, and a desired time of search. The results to be obtained for the satellite trajectory are azimuth, elevation, range, range rate (i.e., velocity), and the doppler frequency shift as a function of time. The problem has been programmed for use on digital electronic computers in both NELIAC and FORTRAN compiler languages and is available for use at both NRL and the David Taylor Model Basin in the Washington, D. C., area. As part of the checking out procedure, a comparison of the results was made with data obtained at the Radio Research Establishment (RRE) in Malvern, England. It was concluded that the major portion of those discrepancies that exist between the NRL and the RRE data is due to differences in the models used. Examples of both NELIAC and FORTRAN input, an example of the FORTRAN output, and the FORTRAN source program for this problem are included in the appendices. (Author)

AD-627 364 Fld. 22/3, 9/2
CFSTI Prices: HC $7.95 MF $2.25
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
TRANSIT ORBIT IMPROVEMENT PROGRAM, VOLUME I.
Mar 61, 495p. Rept. no. TG-401-Vol-1
Contract NOrd-7386

Unclassified report

Descriptors: (*Satellite tracking systems, Doppler systems), (*Doppler systems, Satellite tracking systems), Satellites (Artificial), Orbital trajectories, Position finding, Radio signals, Doppler effect, Data processing systems, Programming (Computers), Numerical methods and procedures

The book is arranged to provide first a pedagogical description of doppler tracking, by way of introduction, followed by theoretical background information, supporting papers, an operations manual for orbit improvement program, and descriptions of the programs themselves. References are included throughout and at the end of most of the articles. Many of the referenced papers are included as part of the book. All the papers originally appeared as internal memorandums of the Laboratory and have been retained in this format in the interests of expediting publication. All the papers can be read independently and are paginated separately.

AD-627 365 Fld. 22/3, 9/2
CFSTI Prices: HC $7.00 MF $1.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
OPERATIONS MANUAL FOR TRANSIT ORBIT IMPROVEMENT PROGRAM, VOLUME II,
by Glen San Lwin, and David C. Wurtzel. 1 Mar 61, 367p. Rept. no. TG-401-Vol-2 ,SRA-43-61
Contract NOrd-7386

Unclassified report

See also AD-627 364.

Descriptors: (*Satellite tracking systems, Doppler systems), (*Doppler systems, Satellite tracking systems), (*Programming (Computers), Satellite tracking systems), Satellites (Artificial), Orbital trajectories, Position finding, Radio signals, Doppler effect, Data processing systems, Instruction manuals

This manual describes procedures for operating the Transit Orbit Improvement Program on the IBM 709 and 7090 Data Processing Systems. Input and output are stressed; the programs are treated essentially as 'black boxes'. To describe input-output, liberal use is made of sample card listings. A typical set of data from Transit 2A is presented together with output listings from a normal run. To describe operations, a comprehensive 'countdown' chart is presented followed by a troubleshooting section based on experience to date. Since the programs are of an experimental nature they contain many diagnostic features not used in daily orbit improvement; reference to them is omitted here but may be found in the program listings. Finally, various presets in the program have been adjusted empirically to the data processed from the satellites 1960 Gamma 2 and 1960 Eta 2 (Transit 1B and 2A). Should the user wish to use these programs for processing data of different characteristics, he is likely to find the necessity for changing preset values and operating procedures.

AD-627 414 Fld. 22/3, 9/2
CFSTI Prices: HC $1.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
TRANSIT GROUND STATION 001.
Mar 62, 21p. Rept. no. TG-438
Contract NOrd-7386

Unclassified report

Descriptors: (*Satellite tracking systems, Ground support equipment), Maryland, Radio equipment, Doppler systems, Tracking, Satellites (Artificial), Orbital trajectories, Position finding, Data processing systems

Transit Ground Station 001 is located in Howard County, Maryland, at an elevation of 484.53 feet (antenna height). The station has the following capabilities. Simultaneous observations of the doppler shift in frequency of any two of the following three pairs of frequencies may be made: 54 mc/324 mc (C system); 150 mc/400 mc (Z system); and 162 mc/216 mc (B system). One set of doppler data, corrected for the first-order effects of ionospheric refraction, may be obtained for each frequency pair of the two observed. The refraction correction may also be obtained separately. The corrected doppler data are obtained in digital form as period count versus time. The data are in 5-level teletypewriter format on punched paper tape ready for transmission to the Transit Control Center. The refraction correction is obtained in analog form on one of the station's two dual-channel stripchart recorders. In lieu of the refraction correction, either the AGC outputs (as a measure of signal strength) or the frequency outputs from four tracking filters may be presented on both stripchart recorders. As a backup, or for test purposes, the receiver output signals are recorded in analog form on magnetic tape along with a 50-kc time signal for later play back and digitization.

AD-627 598 Fld. 22/3
CFSTI Prices: HC $3.00 MF $0.50
RAND CORP SANTA MONICA CALIF
DESCRIPTION AND APPLICATION OF A COMPUTER PROGRAM FOR AREA INSPECTION BY SATELLITE,
by L. N. Rowell, and R. Mobley. Dec 65, 57p. Rept. no. RM-4761-PR
Contract AF49 (638)-1700

Unclassified report

Descriptors: (*Orbital trajectories, Programming (Computers)), Satellites (Artificial)

A digital-computer program for predicting the motion of satellites over long periods of time and in the presence of major perturbations. The program, called the Area Inspection Program (AIP), is designed to compute accurately and inexpensively the position of a satellite relative to several ground stations at once. It is written in FORTRAN IV for the IBM 7044 computer and consists of only one program, with no utility routines except those usually found on a system-library tape, such as SQRT, SIN, and COS. The AIP prints revolution number, area number, local time at the satellite, distance between the satellite and the ground station, the coordinates of the satellite when it enters and leaves a range circle around a ground station, and the corresponding times. These quantities can be computed and printed sequentially for several different ground stations as the satellite moves along its orbit. (Author)

AD-627 796 Fld. 22/3, 17/2.1, 20/9
CFSTI Prices: HC $2.00 MF $0.50
MCDONNELL AIRCRAFT CORP ST LOUIS MO RESEARCH DIV
RE-ENTRY COMMUNICATIONS STUDIES UTILIZING SEEDING TECHNIQUES.
Final scientific rept. 21 Mar 63-31 Mar 65,
by John H. Mullen, Brooks M. Sharp, and Ralph A. Murphy. Oct 65, 46p. Rept. no. B813
Contract AF19 (628)-2764 Proj. AF-4642 Task 464202
AFCRL 65-816

Unclassified report

Descriptors: (*Communication systems, Atmosphere entry), (*Atmosphere entry, Radiofrequency interference), (*Radiofrequency interference, Atmosphere entry), (*Plasma physics, Atmosphere entry), Reentry vehicles, Aerodynamic heating, Ionization, Plasma sheath, Electromagnetic wave reflections, Simulation, Radiofrequency, Plasma generators, Electron density, Reduction

The object of this research was to determine the effects of chemical seedants on the electron concentration of an rf generated air plasma. 'Hot' and 'cold' uncontaminated air plasmas were generated by means of a 25 kW 1 Mc rf generator. A maximum electron density of 2 x 10 to the 12th power electrons/cc was obtained at a pressure of 0.37 torr and air flow of 7.5 x 0.00001 lb/sec. Water, 50% solution of water and ethanol, ethanol, and benzene were added in quantities from zero to 12, 6, 10 and 18% respectively by weight. A radial transmission line was used to measure the electron density and collision frequency. For the 'hot' plasma the results showed that a 1% by weight addition of the seedants reduced the electron concentration to approximately 50% of the original concentration and an addition of 6% reduced the concentration to 25% of the original value. No appreciable difference in electron reduction effects was observed for the four seedants on a weight basis. The electron reduction effects of the seedants in the zero to 1% by weight addition range was considerably greater than that predicted by the first law assuming complete dissociation of the seedant. (Author)

AD-627 399 **See Fld. 9/2**

AD-627 688 **See Fld. 20/4**

22/4. SPACECRAFT LAUNCH VEHICLES AND GROUND SUPPORT

AD-627 663 Fld. 22/4
CFSTI Prices: HC $1.00 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD
STABILITY AND DRAG OF A MODIFIED SATURN/APOLLO SECOND-STAGE CONFIGURATION IN THE NOL PRESSURIZED BALLISTICS RANGE.
Final test rept.,
by David N. Bixler, and Stuart L. Hanlein. 4 Nov 65, 22p. Rept. no. NOLTR-65-122 ,Ballistics Research-146
Task NOL-829

Unclassified report

Descriptors: (*Launch vehicles (Aerospace), Model tests), Drag, Stability, Supersonic characteristics, Hypersonic characteristics, Pressure

Thirty launchings of models of a modified Saturn/Apollo second-stage configuration were performed. The purpose of the launchings was to obtain stability and drag coefficients in a realm of Mach numbers from 4 to 8 and ambient air pressures from 6.3 to 928 mm Hg. (Author)

How To Use Indexes To TAB Portion Of

U. S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS

SUBJECT INDEX

The Subject Index is arranged alphabetically by asterisked descriptors from the document announcements in the TAB. Each announcement contains one or more asterisked descriptors which identify the main subjects of the report. The asterisked descriptor may or may not have a modifying descriptor appearing directly below the asterisked descriptor. Under each descriptor entry in the Subject Index appear the following items of information: annotation, AD number, and field/group. A typical subject index entry is shown below.

*ALUMINUM
GLASS TEXTILES
INVESTIGATION OF GLASS-METAL COMPOSITE MATERIALS
AD-619 773 FLD. 11/7

PERSONAL AUTHOR INDEX

The Personal Author Index is arranged alphabetically by the last names of the authors of reports. When several report entries are given for one author, the entries are arranged numerically by AD number. Field/group and titles are also listed. Three asterisks serve as a separator between entries for reports under the same author. A typical personal author entry is shown below.

*CHASE, JOHN W.
* * *
THE LANTHANUM, EUROPIUM, AND DYSPROSIUM CONTENTS OF TWO TEKTITES
AD-619 828 FLD. 8/7
* * *
A PROCEDURE FOR GEOCHEMICAL INTERPRETATION OF TERRESTRIAL RARE-EARTH ABUNDANCE PATTERNS
AD-619 834 FLD. 8/7

CORPORATE AUTHOR-MONITORING AGENCY INDEX

The Corporate Author-Monitoring Agency Index is arranged alphabetically by corporate authors and monitoring agencies.

In the corporate author entry for each document are listed the originator of the report, the originator's report number, the title, AD number, and field/group. If the source has listed a monitoring agency in the report, the monitor acronym and monitor series number are given in parenthesis directly under the title. An IDEP (Interservice Data Exchange Program) report number is presented in the same way. A typical corporate author entry is shown on the next page.

210-195 O - 66 - 8

*AEROJET- GENERAL CORP AZUSA
CALIF

* * *

TR3015
STUDY OF THE REACTION
OF PENTABORANE WITH HYDRAZINE
AND SUBSTITUTED HYDRAZINES
(AFOSR 65-1058)
AD-619 513 FLD. 7/4

The three asterisks serve as a separator between entries for reports under the same corporate author.

When a report lists a monitoring agency, a corresponding entry is provided under the name of the monitoring agency, which appears in alphabetical order among the corporate author entries. In a monitoring agency entry, the report number is given above the title in place of the originator's report number. A typical monitoring agency entry is shown below.

*AIR FORCE OFFICE OF SCIENTIFIC
RESEARCH WASHINGTON D C

* * *

65-1058
STUDY OF THE REACTION
OF PENTABORANE WITH HYDRAZINE
AND SUBSTITUTED HYDRAZINES
AD-619 513 FLD. 7/4

CONTRACT INDEX

The Contract index is arranged alphanumerically by contract number. Within a contract grouping, each entry contains corporate author, series number (if any), monitor number (if any), AD number, and field/group.

When there are multiple document entries under one contract number, entries are arranged by AD number under each corporate author represented.

A contract entry may also contain a letter F, A, or S on the left-hand margin, indicating that the document is a Final, Annual, or Summary report. A typical contract entry is shown below.

*AF19 628 5167
LINCOLN LAB MASS INST OF TECH
LEXINGTON
(ESD TDR-65-315)
AD-619 580 FLD. 9/5
(ESD TDR-65-309)
AD-619 708 FLD. 3/1

REPORT NUMBER INDEX

The Report Number Index lists identifying numbers assigned either by the document originators or by the sponsors of the work described in the documents. The AD number and field/group location in TAB are given for each report number. If both the originator and the sponsor of a document have assigned identifying numbers, listings for both will appear in the respective alphanumeric positions.

In certain cases accession numbers are also given with the corresponding AD numbers and TAB locations; for instance, the IDEP (Interservice Data Exchange Program) reports and the CFSTI-TT reports (Technical Translations from the Clearinghouse for Federal Scientific and Technical Information).

CCL-183	
AD-620 154	FLD. 11/9
CRSR-203	
AD-620 250	FLD. 3/1
DPS-1677	
AD-469 558	FLD. 19/1A

AD-FIELD INDEX

The AD-Field Index is arranged numerically by AD number and lists the field/group where the full entry can be located in TAB.

SUBJECT INDEX

The fields/groups indicated here apply only to the Technical Abstract Bulletin Section (on white paper).

•ABSORPTION
SEMICONDUCTORS
REPRINT: INFRARED REFRACTIVE INDEX AND ABSORPTION OF INAS AND CDTE.
AD-627 720 FLD. 20/6

•ABSORPTION(BIOLOGICAL)
METALS
REPRINT: ABSORPTION OF NONFERROUS METALS IN IRON DEFICIENCY.
AD-627 287 FLD. 6/5

SKIN
BASIC STUDIES IN PERCUTANEOUS ABSORPTION.
AD-627 810 FLD. 6/16

•ABSTRACTS
SCIENTIFIC RESEARCH
NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF: ABSTRACTS OF MATERIAL SUBMITTED BY CANDIDATES FOR DEGREES, 1964-1965.
AD-627 709 FLD. 5/9

•ACCELEROMETERS
SHOCK(MECHANICS)
NOL COPPER-BALL ACCELEROMETERS.
AD-627 710 FLD. 14/2

•ACETAMIDES
PYROLYSIS
REPRINT: PYROLYSES OF ETHYLY CYANIDE, T-BUTYL CYANIDE, CUMYL CYANIDE, AND ACETAMIDE, AND BOND STRENGTHS IN CYANIDES.
AD-627 833 FLD. 7/3

•ACETONITRILES
PURIFICATION
REPRINT: SIMPLIFIED PURIFICATION OF ACETONITRILE FOR ELECTROANALYTICAL APPLICATIONS.
AD-627 937 FLD. 7/3

•ACETYLCHOLINESTERASE
CHEMICAL REACTIONS
REPRINT: INTERACTION OF THE ACETATES AND CARBAMATES OF SOME HETEROCYCLIC ALCOHOLS WITH ACETYLCHOLINESTERASE.
AD-627 871 FLD. 6/1

•ACHIEVEMENT TESTS
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AD-627 556 FLD. 7/4

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HARVARD COLL OBSERVATORY CAMBRIDGE MASS SOLAR DEPT
SCIENTIFIC-8
(AFCRL-69-890)
AD-627 876 FLD. 3/3

•AF19(628)-3836
NORTHEASTERN UNIV BOSTON MASS PHOTOCHEMISTRY AND SPECTROSCOPY LAB
SCIENTIFIC-3
(AFCRL-69-716)
AD-627 933 FLD. 7/3

•AF19(628)-3890
HARVARD COLL OBSERVATORY CAMBRIDGE MASS
(AFCRL-66-26)
F AD-627 318 FLD. 4/1

•AF19(628)-4195
SPERRY RAND RESEARCH CENTER SUDBURY MASS
SRRC-RR-69-94
(AFCRL-69-826)
F AD-627 920 FLD. 17/2

•AF19(628)-4319
ANDREW CORP ORLAND PARK ILL
(AFCRL-69-790)
F AD-627 922 FLD. 9/3

•AF19(628)-4337
ILLINOIS UNIV URBANA DEPT OF ELECTRICAL ENGINEERING
(AFOSR-69-2073)
AD-627 966 FLD. 20/3

•AF19(628)-4769
PHILCO CORP BLUE BELL PA ADVANCED TECHNOLOGY CENTER
(AFCRL-69-907)
F AD-627 376 FLD. 9/3

•AF19(628)-5029
GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT STATION
G-T-R-69-7
AD-627 998 FLD. 12/1
G-T-R-69-3
(TT-66-60998)
AD-627 491 FLD. 3/1

•AF19(628)-5167
LINCOLN LAB MASS INST OF TECH LEXINGTON
TN-1969-56
(ESD-TDR-69-990)
AD-627 387 FLD. 17/2,1
TR-399
(ESD-TDR-69-325)
AD-627 965 FLD. 17/9
(ESD-TDR-69-905)
AD-627 920 FLD. 9/1
GR-1969-11
(ESD-TDR-69-906)
AD-627 605 FLD. 18/8
TR-373
(ESD-TDR-69-32)
AD-627 635 FLD. 20/14

•AF29(601)-62-9217
AIR FORCE WEAPONS LAB KIRTLAND AFB N MEX
AFWL-TR-69-112
AD-627 862 FLD. 6/18

•AF29(601)-6213
GENERAL DYNAMICS/FORT WORTH TEX NUCLEAR AEROSPACE RESEARCH FACILITY
FZK-184-3
AD-627 670 FLD. 21/6

•AF29(601)-6293
GENERAL AMERICAN TRANSPORTATION CORP NILES ILL
(RTD-TDR-63-3096-VOL-2)
AD-627 597 FLD. 18/3
MRD DIV GENERAL AMERICAN TRANSPORTATION CORP NILES ILL
(RTD-TDR-63-3096-VOL-3)
AD-627 916 FLD. 18/3
NEWMARK HANSEN AND ASSOCIATES URBANA ILL
(RTD-TDR-63-3096-VOL-4)
AD-627 870 FLD. 18/3

•AF29(601)-6369
ILLINOIS UNIV URBANA DEPT OF CIVIL ENGINEERING
(AFWL-TR-69-29)
AD-627 899 FLD. 8/13

•AF30(602)-3030
PENNSYLVANIA UNIV PHILADELPHIA
(RADC-69-378)
F AD-627 799 FLD. 9/2

•AF30(602)-3494
SCOPE INC FALLS CHURCH VA
(RADC-TR-69-301)
F AD-627 899 FLD. 14/5

•AF30(602)-3462
BUNKER-RAMO CORP CANOGA PARK CALIF
(RADC-TR-69-340)
F AD-627 763 FLD. 9/7

•AF30(602)-3896
SYSTEMS ENGINEERING LAB UNIV OF MICHIGAN ANN ARBOR
SEL-69-1
AD-627 374 FLD. 9/1

•AF30(602)-3707
MARCHETTI (J B) INC NATICK MASS
G-149-QR-1
(RADC-TR-69-357)
AD-627 896 FLD. 9/5

•AF33(600)-39852
MITRE CORP BEDFORD MASS
M69-1A
(ESD-TR-69-407)
AD-627 924 FLD. 9/2

•AF33(600)-39963
MELPAR INC FALLS CHURCH VA
AD-627 316 FLD. 17/2
AD-627 989 FLD. 17/2

•AF33(615)-1095
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
ERL-69-33

AD-627 797 FLD. 9/2

•AF33(615)-1078
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB 112
(AFOSR-65-2301)
AD-628 004 FLD. 20/9

•AF33(615)-1553
MICHIGAN UNIV ANN ARBOR ORA-06349-11-S
AD-627 673 FLD. 9/5

•AF33(615)-1845
CORNELL AERONAUTICAL LAB INC BUFFALO N Y
AA-1948-Y-3
(AFFDL-TR-65-199)
F AD-627 798 FLD. 20/4

•AF 33(615)-1849
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
AMRL-TR-65-122
F AD-627 341 FLD. 6/20

•AF33(615)-2193
UNITED STATES INDUSTRIAL CHEMICALS CO CINCINNATI OHIO
(AFML-TR-65-362)
AD-627 438 FLD. 7/2

•AF33(615)-2352
MANLABS INC CAMBRIDGE MASS
AD-627 387 FLD. 20/13

•AF33(615)-2766
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
UTIAS-TN-93
AD-627 571 FLD. 14/2

•AF 33(616)-7132
MIAMI UNIV OXFORD OHIO
(AMRL-TR-65-219)
AD-627 425 FLD. 5/10

•AF33(657)-7399
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV
AD-627 381 FLD. 20/12

•AF33(657)-7805
MARYLAND UNIV COLLEGE PARK
(ARL-63-175-PT-3)
AD-627 935 FLD. 20/9

•AF33(657)-8451
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
UTIAS-110
AD-627 573 FLD. 1/3

•AF33(657)-9185
NEW YORK UNIV N Y DEPT OF ELECTRICAL ENGINEERING
(AFOSR-65-2077)
AD-627 717 FLD. 12/2

•AF33(657)-10058
RENSSELAER POLYTECHNIC INST TROY N Y DEPT OF MECHANICS
(AFML-TR-65-372)
AD-627 672 FLD. 20/11

•AF33(657)-10224
ILLINOIS UNIV URBANA DEPT OF ELECTRICAL ENGINEERING
(AFOSR-65-2059)
AD-627 726 FLD. 20/5
(AFOSR-65-2056)
AD-627 727 FLD. 20/5

•AF33(657)-10907
SYSTEMS TECHNOLOGY INC HAWTHORNE CALIF
STI-TR-133-2-PT-1
(AFFDL-TR-65-138-PT-1)
F AD-627 659 FLD. 1/2
(AFFDL-TR-65-138-PT-2)

AD-627 989 FLD. 1/1

•AF 33(657)-10956
MIAMI UNIV OXFORD OHIO
(AMRL-TR-65-159)
AD-627 424 FLD. 5/10

•AF33(657)-11102
NORTH AMERICAN AVIATION INC COLUMBUS OHIO
(AMRL-TR-65-174)
F AD-627 671 FLD. 5/8

•AF33(657)-11401
AEROJET-GENERAL CORP AZUSA CALIF 2835
(AL-TDR-64-97)
F AD-627 405 FLD. 20/6

•AF40(600)-1200
ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN
AEDC-TR-65-234
AD-627 317 FLD. 20/4
AEDC-TR-65-202
AD-628 031 FLD. 14/2
ARO INC TULLAHOMA TENN
(AEDC-TR-65-260)
AD-627 988 FLD. 20/9

•AF41(609)-2293
SOUTHWEST RESEARCH INST SAN ANTONIO TEX
AD-627 686 FLD. 22/1

•AF 41(609)-2426
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS
AD-627 328 FLD. 6/19

•AF41(609)-2439
MIDWEST RESEARCH INST KANSAS CITY MO
F AD-627 371 FLD. 6/13

•AF41(609)-2699
GENERAL ELECTRIC CO OKLAHOMA CITY OKLA
F AD-627 332 FLD. 6/6

•AF41(609)-2715
SOUTHWEST RESEARCH INST SAN ANTONIO TEX DEPT OF STRUCTURAL RESEARCH
F AD-627 430 FLD. 13/12

•AF49(628)-1389
INSTITUTE OF THEORETICAL PHYSICS STANFORD UNIV CALIF
(AFOSR-65-2696)
AD-627 781 FLD. 20/8

•AF49(628)-1700
RAND CORP SANTA MONICA CALIF
RM-4936-PR
AD-627 643 FLD. 12/1

•AF49(628)-2912
TECHNICAL OPERATIONS INC BURLINGTON MASS
TO-B-65-104
(AFCRL-65-819)
F AD-627 615 FLD. 17/9

•AF49(628)-5167
LINCOLN LAB MASS INST OF TECH LEXINGTON
TN-1965-45
(ESD-TDR-65-589)
AD-627 600 FLD. 22/2

•AF 49(638)-402
CORNELL UNIV ITHACA N Y LAB OF ATOMIC AND SOLID STATE PHYSICS
(AFOSR-65-1987)
AD-627 962 FLD. 18/4

•AF49(638)-529
ILLINOIS UNIV URBANA DEPT OF PHYSICS
(AFOSR-65-2032)
AD-627 632 FLD. 20/12
(AFOSR-65-2952)
AD-627 779 FLD. 20/12

•AF49(638)-673
TRG INC MELVILLE N Y
(AFOSR-65-2817)
AD-627 967 FLD. 20/5

•AF49(638)-700
RAND CORP SANTA MONICA CALIF
RM-4778-PR
AD-627 448 FLD. 19/5
RM-4764-PR
AD-627 611 FLD. 14/1

•AF49(638)-719
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
(AFOSR-65-2160)
AD-627 512 FLD. 20/2
(AFOSR-65-2161)
AD-627 513 FLD. 20/2
(AFOSR-65-2387)
AD-627 955 FLD. 20/2

•AF49(638)-782
CORNELL AERONAUTICAL LAB INC BUFFALO N Y
(AFOSR-65-1711)
AD-627 987 FLD. 7/4

•AF49(638)-957
PENNSYLVANIA STATE UNIV UNIVERSITY PARK
(AFOSR-65-2024)
AD-627 716 FLD. 20/12

•AF49(638)-1029
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
(AFOSR-65-2034)
AD-627 581 FLD. 11/6
(AFOSR-65-2033)
AD-627 582 FLD. 20/2
(AFOSR-65-2036)
AD-627 583 FLD. 11/6
(AFOSR-65-1999)
AD-627 784 FLD. 7/4

•AF49(638)-1063
ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF
EOS-1690-FINAL
(AFOSR-65-0194)
F AD-628 034 FLD. 19/1

•AF49(638)-1123
STANFORD UNIV CALIF
(AFOSR-65-2013)
F AD-627 658 FLD. 10/1

•AF49(638)-1124
STANFORD RESEARCH INST MENLO PARK CALIF
MSC1-65-30
(AFOSR-65-2308)
AD-628 033 FLD. 19/4

•AF49(638)-1169
ATLANTIC RESEARCH CORP ALEXANDRIA VA KINETICS AND COMBUSTION GROUP
(AFOSR-66-0157)
F AD-628 035 FLD. 21/9.2

•AF 49(638)-1171
LITTLE (ARTHUR D) INC CAMBRIDGE MASS
(AROD-006:12)
AD-627 315 FLD. 7/4

•AF49(638)-1177
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
(AFOSR-65-1998)
AD-627 557 FLD. 20/13

•AF 49(638)-1200
OPTICS TECHNOLOGY INC BELMONT CALIF

(AFOSR-65-1977)
AD-627 956 FLD. 20/5

•AF99(638)-1221
UNITE AIRCRAFT CORP EAST HARTFORD CONN RESEARCH LABS
(AFOSR-65-2900)
AD-628 024 FLD. 20/9

•AF99(638)-1228
SPACE SCIENCES INC WALTHAM MASS
SSI-9A-FR
(AFOSR-66-0138)
F AD-627 909 FLD. 20/9

•AF99(638)-1242
RIAS INC BALTIMORE MD
(AFOSR-65-2435)
AD-627 563 FLD. 12/2

•AF99(638)-1259
COLUMBIA UNIV NEW YORK
(AFOSR-65-2494)
AD-628 015 FLD. 20/13

•AF99(638)-1262
POLYTECHNIC INST OF BROOKLYN N Y
(AFOSR-65-2501)
AD-628 019 FLD. 21/8.1

•AF99(638)-1274
STANFORD UNIV CALIF DEPT OF AERONAUTICS AND ASTRONAUTICS
SUDAER-247
(AFOSR-65-2019)
AD-627 659 FLD. 20/9

•AF99(638)-1290
POLYTECHNIC INST OF BROOKLYN N Y
DEPT OF MECHANICAL ENGINEERING
SCIENTIFIC-9
(AFOSR-65-1921)
AD-627 961 FLD. 20/11
SCIENTIFIC-5
(AFOSR-65-1923)
AD-627 962 FLD. 20/11
SCIENTIFIC-6
(AFOSR-65-1922)
AD-627 963 FLD. 20/11

•AF99(638)-1320
ROCHESTER UNIV N Y
(AFOSR-65-2481)
AD-627 957 FLD. 20/1

•AF99(638)-1341
STANFORD UNIV CALIF DEPT OF CHEMISTRY
(AFOSR-65-2768)
AD-627 956 FLD. 7/4

•AF99(638)-1348
GRADUATE AERONAUTICAL LABS CALIF INST OF TECH PASADENA
(AFOSR-65-2019)
F AD-627 901 FLD. 20/9
(AFOSR-65-2020)
F AD-627 902 FLD. 20/9

•AF99(638)-1356
GENERAL ATOMIC SAN DIEGO CALIF
GA-6179
F AD-628 018 FLD. 20/9

•AF99(638)-1362
GENERAL ELECTRIC CO SCHENECTADY N Y RESEARCH AND DEVELOPMENT CENTER
65-C-038
(AFOSR-65-2883)
AD-627 837 FLD. 20/12
65-C-039
(AFOSR-65-2769)
AD-628 016 FLD. 7/4

•AF99(638)-1377
NORTHWESTERN UNIV EVANSTON ILL
DEPT OF ELECTRICAL ENGINEERING
(AFOSR-65-2340)
AD-627 561 FLD. 20/3

•AF99(638)-1380
HARVARD UNIV CAMBRIDGE MASS
(AFOSR-65-2790)
AD-627 783 FLD. 20/1

•AF99(638)-1389
INSTITUTE OF THEORETICAL PHYSICS
STANFORD UNIV CALIF
(AFOSR-65-2096)
AD-627 633 FLD. 20/8

•AF99(638)-1400
ASTROSYSTEMS INTERNATIONAL INC
FAIRFIELD N J
(AFOSR-65-2238)
AD-627 978 FLD. 21/9

•AF99(638)-1401
SYRACUSE UNIV N Y
(AFOSR-65-2658)
AD-627 786 FLD. 12/1

•AF99(638)-1437
AERONAUTICAL RESEARCH ASSOCIATES OF PRINCETON INC N J
(AFOSR-65-2208)
F AD-627 953 FLD. 20/4
ARAP-79
(AFOSR-65-2656)
AD-627 972 FLD. 12/1

•AF99(638)-1439
HUGHES RESEARCH LABS MALIBU CALIF
(AFOSR-65-2104)
AD-627 713 FLD. 20/3

•AF99(638)-1445
STD RESEARCH CORP PASADENA CALIF
(AFOSR-65-2503)
AD-627 958 FLD. 20/9
STD-65-12
(AFOSR-66-0004)
F AD-628 029 FLD. 20/9

•AF99(638)-1449
BELL AEROSYSTEMS CO BUFFALO N Y
9500-920032
(AFOSR-65-2710)
F AD-627 908 FLD. 9/2

•AF 99(638)-1468
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
(AFOSR-65-1982)
AD-627 480 FLD. 20/9
(AFOSR-65-2023)
AD-627 481 FLD. 20/8
(AFOSR-65-2031)
AD-627 482 FLD. 20/1
(AFOSR-65-2022)
AD-627 617 FLD. 20/3
(AFOSR-65-2021)
AD-627 618 FLD. 20/3
(AFOSR-65-2026)
AD-627 619 FLD. 20/14
(AFOSR-65-2025)
AD-627 620 FLD. 20/3
(AFOSR-62-2000)
AD-627 779 FLD. 20/2
(AFOSR-65-2559)
AD-627 777 FLD. 20/3
(AFOSR-65-2584)
AD-627 954 FLD. 7/4
(AFOSR-65-2586)
AD-627 959 FLD. 20/3

•AF99(638)-1499
STD RESEARCH CORP PASADENA CALIF
STD-65-12
(AFOSR-66-0004)
F AD-628 029 FLD. 20/9

•AF99(638)-1700
RAND CORP SANTA MONICA CALIF
RM-4761-PR
AD-627 598 FLD. 22/3
RM-4824-PR
AD-627 602 FLD. 22/2
RM-4720-PR
AD-627 644 FLD. 19/5
RM-4848-PR
AD-627 886 FLD. 14/1

•AF61(052)-599
CHALMERS UNIV OF TECHNOLOGY GOTEBORG (SWEDEN) RESEARCH LAB OF ELECTRONICS
TN-6
(RADC-TR-66-28)
AD-627 930 FLD. 9/1

•AF61(052)-697
INSTITUTO GEOGRAFICO Y CATASTRAL MADRID (SPAIN)
(AFOSR-65-2318)
AD-628 023 FLD. 8/11

•AF61(052)-683
FORSVARETS FORSKNINGSINSTITUTT KJELLER (NORWAY)
SCIENTIFIC-3
(RADC-TR-66-27)
AD-627 921 FLD. 9/5
INTERN RAPPORT-E-68
(RADC-TR-66-26)
AD-627 922 FLD. 9/5

•AF61(052)-733
DURHAM UNIV (ENGLAND) DEPT OF GEOLOGY
SCIENTIFIC-9
(AFOSR-65-2929)
AD-627 840 FLD. 8/7

•AF61(052)-803
NATIONAL OBSERVATORY OF ATHENS (GREECE) SEISMOLOGICAL INST
(AFOSR-65-2938)
AD-627 616 FLD. 8/11

•AF998(638)-1348
GRADUATE AERONAUTICAL LABS CALIF INST OF TECH PASADENA
(AFOSR-65-2018)
F AD-627 900 FLD. 20/9

•AF998(638)-1468
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
(AFOSR-65-1990)
AD-627 959 FLD. 20/3

•AF-AFOSR-1-63
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
PIBAL-896
(AFOSR-65-2007)
F AD-627 688 FLD. 20/4

•AF-AFOSR-2-63
DELAWARE UNIV NEWARK DEPT OF ELECTRICAL ENGINEERING
(AFOSR-65-2038)
AD-627 988 FLD. 9/4

•AF-AFOSR-23-63
TEXAS TECHNOLOGICAL COLL LUBBOCK DEPT OF CHEMISTRY
(AFOSR-65-2762)
AD-627 831 FLD. 7/2
(AFOSR-65-2763)
AD-627 832 FLD. 7/2

•AF-AFOSR-27-63
VICTORIA UNIV WELLINGTON (NEW ZEALAND) DEPT OF CHEMISTRY
(AFOSR-65-2530)
F AD-627 923 FLD. 7/2

•AF-AFOSR-39-63
IDAHO UNIV MOSCOW DEPT OF PHYSICAL SCIENCES
(AFOSR-65-2042)
AD-627 990 FLD. 7/5

•AF-AFOSR-43-63
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF PHYSICS
(AFOSR-65-0243)
F AD-627 697 FLD. 20/11

•AF-AFOSR-51-63
WISCONSIN UNIV MADISON

(AFOSR-65-2726)
F AD-628 026 FLD. 7/4

•AF-AFOSR-61-63
MELLON INST PITTSBURGH PA
(AFOSR-65-2179)
AD-627 542 FLD. 7/4
(AFOSR-65-2175)
AD-627 543 FLD. 7/4
OHIO STATE UNIV COLUMBUS DEPT OF CHEMISTRY
(AFOSR-65-2178)
AD-627 559 FLD. 7/4
(AFOSR-65-2177)
AD-627 555 FLD. 7/4

•AF-AFOSR-62-98
PITTSBURGH UNIV PA DEPT OF CHEMISTRY
(AFOSR-65-2009)
F AD-627 269 FLD. 7/3

•AF-AFOSR-62-93
GEORGIA UNIV ATHENS DEPT OF CHEMISTRY
(AFOSR-65-2760)
AD-627 828 FLD. 7/3
(AFOSR-65-2761)
AD-627 829 FLD. 7/3
(AFOSR-65-2759)
AD-627 830 FLD. 7/3

•AF-AFOSR-62-89
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF MATHEMATICS
(AFOSR-65-2628)
AD-627 976 FLD. 12/1

•AF-AFOSR-62-179
ILLINOIS UNIV URBANA
(AFOSR-65-2589)
AD-627 747 FLD. 20/12

•AF-AFOSR-62-236A
UNIVERSITY OF WESTERN ONTARIO LONDON
(AFOSR-65-2316)
AD-627 819 FLD. 7/4
UNIVERSITY OF WESTERN ONTARIO LONDON DEPT OF PHYSICS
(AFOSR-65-2315)
AD-627 596 FLD. 7/4

•AF-AFOSR-62-237
TEXAS UNIV AUSTIN DEPT OF CHEMICAL ENGINEERING
(AFOSR-65-1925)
AD-627 938 FLD. 7/2

•AF-AFOSR-62-252
MINNESOTA UNIV MINNEAPOLIS DEPT OF MATHEMATICS
(AFOSR-65-2642)
AD-627 770 FLD. 12/1

•AF-AFOSR-62-290
MICHIGAN TECHNOLOGICAL UNIV HOUGHTON DEPT OF METALLURGY
(AFOSR-65-2560)
AD-627 748 FLD. 20/12

•AF-AFOSR-62-307
NORTHWESTERN UNIV EVANSTON ILL GAS DYNAMICS LAB
NU-GDL-8-3-65
(AFOSR-65-2215)
AD-627 267 FLD. 20/9

•AF-AFOSR-62-391
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION SYDNEY (AUSTRALIA) DIV OF PHYSICS
(AFOSR-65-2949)
AD-627 622 FLD. 20/12

•AF-AFOSR-62-400
NEW SOUTH WALES UNIV KENSINGTON (AUSTRALIA) DEPT OF APPLIED MATHEMATICS
(AFOSR-65-2975)
AD-627 946 FLD. 20/12
(AFOSR-65-2796)
AD-627 677 FLD. 20/8

•AF-AFOSR-62-909
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
PIBAL-897
(AFOSR-65-2230)
F AD-627 472 FLD. 20/4

•AF-AFOSR-68-63
LOUISIANA STATE UNIV BATON ROUGE DEPT OF MATHEMATICS
(AFOSR-65-2180)
AD-627 948 FLD. 12/1

•AF-AFOSR-77-63
CALIFORNIA UNIV LOS ANGELES
(AFOSR-65-2928)
AD-627 750 FLD. 12/1

•AF-AFOSR-86-63
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
PIBAL-796
(AFOSR-65-2307)
AD-627 964 FLD. 20/1

•AF-AFOSR-106-65
OREGON STATE UNIV CORVALLIS DEPT OF CHEMISTRY
(AFOSR-65-2045)
AD-627 774 FLD. 7/3

•AF-AFOSR-111-63
PRINCETON UNIV N J DEPT OF AEROSPACE AND MECHANICAL SCIENCES
F AD-627 712 FLD. 21/9.1

•AF-AFOSR-130-65
CALIFORNIA UNIV BERKELEY DEPT OF PHYSICS
(AFOSR-65-2096)
AD-627 729 FLD. 20/2

•AF-AFOSR-132-65
OKLAHOMA STATE UNIV STILLWATER DEPT OF CHEMISTRY
(AFOSR-65-2097)
AD-627 734 FLD. 7/3
(AFOSR-65-2098)
AD-627 953 FLD. 7/3

•AF-AFOSR-134-65
PURDUE UNIV LAFAYETTE IND DEPT OF CHEMISTRY
(AFOSR-65-2767)
AD-627 936 FLD. 7/2

•AF-AFOSR-139-64
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
ERL-65-33
AD-627 797 FLD. 9/2
112
(AFOSR-65-2301)
AD-628 004 FLD. 20/9

•AF-AFOSR-139-65
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
ERL-65-34
AD-627 917 FLD. 9/5

•AF-AFOSR-141-64
MARYLAND UNIV COLLEGE PARK INST FOR FLUID DYNAMICS AND APPLIED MATHEMATICS
(AFOSR-65-2055)
AD-627 742 FLD. 20/9

•AF-AFOSR-141-65
MARYLAND UNIV COLLEGE PARK INST FOR FLUID DYNAMICS AND APPLIED MATHEMATICS
(AFOSR-65-2054)
AD-627 477 FLD. 20/9

•AF-AFOSR-168-63
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF ENGINEERING MECHANICS
(AFOSR-65-2476)
AD-627 977 FLD. 11/6

•AF-AFOSR-171-63
CALIFORNIA UNIV BERKELEY DEPT OF ASTRONOMY
(AFOSR-65-2818)
AD-627 966 FLD. 3/2

•AF-AFOSR-196-63
PITTSBURGH UNIV PA DEPT OF PHYSICS
(AFOSR-65-2093)
AD-627 380 FLD. 20/12

•AF-AFOSR-201-63
BRIGHAM YOUNG UNIV PROVO UTAH
(AFOSR-65-2588)
AD-627 751 FLD. 20/12

•AF-AFOSR-222-64
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
UTIAS-TN-95
AD-627 570 FLD. 5/5

•AF-AFOSR-223-64
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
UTIAS-TN-88
AD-627 572 FLD. 4/2

•AF-AFOSR-232-65
CALIFORNIA UNIV BERKELEY DEPT OF PHYSICS
(AFOSR-65-2797)
AD-627 728 FLD. 20/8

•AF-AFOSR-237-65
ROCHESTER UNIV N Y DEPT OF PHYSICS AND ASTRONOMY
(AFOSR-65-2057)
AD-627 739 FLD. 20/6

•AF-AFOSR-270-63
NORTHWESTERN UNIV EVANSTON ILL
(AFOSR-65-2429)
AD-627 944 FLD. 12/2

•AF-AFOSR-272-65
ILLINOIS UNIV URBANA DEPT OF ELECTRICAL ENGINEERING
(AFOSR-65-2058)
AD-627 724 FLD. 20/3
(AFOSR-65-2059)
AD-627 726 FLD. 20/5
(AFOSR-65-2056)
AD-627 727 FLD. 20/5

•AF-AFOSR-292-64
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
(AFOSR-65-2432)
AD-627 761 FLD. 12/2
(AFOSR-65-2433)
AD-627 762 FLD. 9/5

•AF-AFOSR-324-63
CORNELL UNIV ITHACA N Y DEPT OF CHEMISTRY
(AFOSR-65-2956)
AD-627 982 FLD. 20/8

•AF-AFOSR-329-63
NORTHWESTERN UNIV EVANSTON ILL GAS DYNAMICS LAB
NU-GDL-8-3-65
(AFOSR-65-2215)
AD-627 267 FLD. 20/9

•AF-AFOSR-331-63
CALIFORNIA UNIV BERKELEY
(AFOSR-65-2787)
AD-627 759 FLD. 4/1
CALIFORNIA UNIV BERKELEY DEPT OF PHYSICS
(AFOSR-65-2798)

AD-627 941 FLD. 9/1

•AF-AFOSR-337-63
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS
(AFOSR-65-2398)
AD-627 738 FLD. 9/1
(AFOSR-65-2422)
AD-627 739 FLD. 9/1
(AFOSR-65-2359)
AD-627 740 FLD. 9/1
(AFOSR-65-2360)
AD-627 741 FLD. 9/1
(AFOSR-65-2357)
AD-627 970 FLD. 9/5

•AF-AFOSR-339-63
RENSSELAER POLYTECHNIC INST TROY N Y
(AFOSR-65-2423)
AD-627 771 FLD. 12/2

•AF-AFOSR-357-63
INSTITUTE FOR ADVANCED STUDY PRINCETON N J
(AFOSR-65-2630)
AD-627 951 FLD. 12/1

•AF-AFOSR-361-63
WINDS R UNIV (ONTARIO) DEPT OF PHY ICS
(AFOSR-65-2060)
AD-627 629 FLD. 7/4

•AF-AFOSR-373-63
MICHIGAN UNIV ANN ARBOR DEPT OF MATHEMATICS
(AFOSR-65-2626)
AD-627 975 FLD. 12/1

•AF-AFOSR-381-63
MINNESOTA UNIV MINNEAPOLIS
(AFOSR-65-2632)
AD-627 979 FLD. 12/1
(AFOSR-65-2631)
AD-627 980 FLD. 12/1
(AFOSR-65-2623)
AD-627 981 FLD. 12/1
MINNESOTA UNIV MINNEAPOLIS DEPT OF ATHEMATICS
(AFOSR-65-2634)
AD-627 834 FLD. 12/1
(AFOSR-65-2638)
AD-627 835 FLD. 12/1

•AF-AFOSR-389-63
BOSTON UNIV MASS DEPT OF PHYSICS
(AFOSR-65-2800)
AD-627 623 FLD. 12/1

•AF-AFOSR-394-64
YALE UNIV NEW HAVEN CONN
(AFOSR-65-2688)
AD-627 773 FLD. 20/8

•AF-AFOSR-413-63
COMMUNICATION RESEARCH INST MIAMI FLA
(AFOSR-65-2944)
AD-627 827 FLD. 6/3

•AF-AFOSR-424-63
SYRACUSE UNIV N Y
(AFOSR-65-2343)
AD-627 949 FLD. 12/1

•AF-AFOSR-425-63
SYRACUSE UNIV N Y
(AFOSR-65-1905)
AD-627 471 FLD. 20/12

•AF-AFOSR-445-63
CATHOLIC UNIV OF AMERICA WASHINGTON D C DEPT OF PHYSICS
(AFOSR-65-2781)
AD-627 628 FLD. 20/3

•AF-AFOSR-460-63
ILLINOIS UNIV URBANA
(AFOSR-65-2599)
AD-627 946 FLD. 12/1
(AFOSR-65-2640)
AD-627 948 FLD. 12/1

•AF-AFOSR-470-64
PITTSBURGH UNIV PA DEPT OF CHEMISTRY
(AFOSR-65-2009)
F AD-627 269 FLD. 7/5

•AF-AFOSR-476-64
UTAH UNIV SALT LAKE CITY DEPT OF CHEMISTRY
UUCD-2-64
(AFOSR-65-2941)
F AD-628 027 FLD. 7/4

•AF-AFOSR-482-65
WASHINGTON UNIV ST LOUIS MO
(AFOSR-65-2061)
AD-627 737 FLD. 12/2

•AF-AFOSR-496-64
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING
(AFOSR-65-2103)
AD-627 965 FLD. 9/5
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES ELECTRONIC SCIENCES LAB
(AFOSR-65-2118)
AD-627 944 FLD. 17/2

•AF-AFOSR-496-65
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING
(AFOSR-65-2062)
AD-627 719 FLD. 7/4
(AFOSR-65-2063)
AD-627 720 FLD. 20/6
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES ELECTRONIC SCIENCES LAB
(AFOSR-65-2648)
F AD-628 029 FLD. 9/3

•AF-AFOSR-499-65
NEW YORK UNIV N Y DEPT OF ELECTRICAL ENGINEERING
(AFOSR-65-2064)
AD-627 687 FLD. 9/4
(AFOSR-65-2424)
AD-627 968 FLD. 12/2

•AF-AFOSR-500-64
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
(AFOSR-65-2794)
AD-627 679 FLD. 20/8
(AFOSR-65-2793)
AD-627 744 FLD. 20/8
(AFOSR-65-2783)
AD-627 892 FLD. 20/8

•AF-AFOSR-520-64
CHICAGO UNIV ILL
(AFOSR-65-2645)
AD-627 626 FLD. 12/1

•AF-AFOSR-523-64
CALIFORNIA UNIV RIVERSIDE
(AFOSR-65-2939)
AD-627 960 FLD. 20/12

•AF-AFOSR-527-64
SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS PHILADELPHIA PA•
(AFOSR-65-2123)
AD-627 718 FLD. 12/2

•AF-AFOSR-542-64
STATE UNIV OF NEW YORK STONY BROOK
(AFOSR-65-2333)
AD-627 778 FLD. 12/2

•AF-AFOSR-584-64
NORTH CAROLINA UNIV CHAPEL HILL DEPT OF CHEMISTRY
(AFOSR-65-2764)
AD-627 826 FLD. 7/3
(AFOSR-65-2766)
AD-627 836 FLD. 7/2
(AFOSR-65-2765)
AD-627 838 FLD. 7/4

•AF-AFOSR-610-64
CALIFORNIA UNIV LA JOLLA DEPT OF PHYSICS
(AFOSR-65-2940)
AD-627 627 FLD. 20/8
(AFOSR-65-2941)
AD-627 769 FLD. 20/13

•AF-AFOSR-611-64
ILLINOIS UNIV URBANA
(AFOSR-65-2092)
AD-627 983 FLD. 7/4

•AF-AFOSR-626-65
DUNHAM LAB YALE UNIV NEW HAVEN CONN
(AFOSR-65-2066)
AD-627 989 FLD. 20/3
SLOANE PHYSICS LAB YALE UNIV NEW HAVEN CONN
(AFOSR-65-2065)
AD-627 690 FLD. 20/3

•AF-AFOSR-631-64
CALIFORNIA UNIV LA JOLLA
(AFOSR-65-2106)
AD-627 945 FLD. 20/12
(AFOSR-65-2936)
AD-627 764 FLD. 7/4

•AF-AFOSR-662-64
FLORIDA STATE UNIV TALLAHASSEE INST OF MOLECULAR BIOPHYSICS
BSCS-PAMPLETS-24
(AFOSR-65-2976)
AD-627 950 FLD. 6/1

•AF-AFOSR-672-64
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
UTIAS-TN-88
AD-627 572 FLD. 9/2
(AFOSR-65-2714)
F AD-627 897 FLD. 20/1

•AF-AFOSR-698-65
CALIFORNIA UNIV SANTA BARBARA DEPT OF MATHEMATICS
(AFOSR-65-2068)
AD-627 630 FLD. 12/1
(AFOSR-65-2069)
AD-627 631 FLD. 12/1
(AFOSR-65-2071)
AD-627 949 FLD. 12/1

•AF-AFOSR-714-65
ILLINOIS UNIV URBANA DEPT OF ELECTRICAL ENGINEERING
(AFOSR-65-2073)
AD-627 966 FLD. 20/3

•AF-AFOSR-722-65
PURDUE UNIV LAFAYETTE IND
(AFOSR-65-2639)
AD-627 940 FLD. 12/1

•AF-AFOSR-738-65
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
(AFOSR-65-2109)
AD-627 971 FLD. 20/3
(AFOSR-65-2108)
AD-627 973 FLD. 20/13

•AF-AFOSR-747-65
NEW YORK UNIV N Y
(AFOSR-65-2079)
AD-627 736 FLD. 12/2
NEW YORK UNIV N Y DEPT OF ELECTRICAL ENGINEERING
(AFOSR-65-2076)
AD-627 683 FLD. 12/2
(AFOSR-65-2077)
AD-627 717 FLD. 12/2

•AF-AFOSR-753-65

PURDUE UNIV LAFAYETTE IND SCHOOL OF MECHANICAL ENGINEERING
(AFOSR-69-2078)
AD-627 995 FLD. 21/8

•AF-AFOSR-771-69
WASHINGTON UNIV ST LOUIS MO DEPT OF CHEMISTRY
(AFOSR-69-2079)
AD-627 994 FLD. 7/3

•AF-AFOSR-777-69
MASSACHUSETTS UNIV AMHERST DEPT OF CHEMISTRY
(AFOSR-69-2385)
AD-627 937 FLD. 7/3

•AF-AFOSR-785-69
CHICAGO UNIV ILL
(AFOSR-69-2080)
AD-627 996 FLD. 20/13
CHICAGO UNIV ILL INST FOR THE STUDY OF METALS
(AFOSR-69-2083)
AD-627 725 FLD. 20/13
(AFOSR-69-2082)
AD-627 730 FLD. 20/13
(AFOSR-69-2081)
AD-627 731 FLD. 20/13

•AF-AFOSR-793-69
MINNESOTA UNIV MINNEAPOLIS SCHOOL OF PHYSICS
(AFOSR-69-2084)
AD-627 505 FLD. 20/13
(AFOSR-69-2085)
AD-627 506 FLD. 20/4

•AF-AFOSR-808-69
NORTH CAROLINA STATE UNIV RALEIGH DEPT OF MECHANICAL ENGINEERING
(AFOSR-69-2086)
AD-627 739 FLD. 20/13

•AF-AFOSR-828-69
RICE UNIV HOUSTON TEX
(AFOSR-69-2087)
AD-627 668 FLD. 20/4

•AF-EOAR-2-63
UNIVERSITY COLL LONDON (ENGLAND) DEPT OF ANATOMY
(AFOSR-69-2840)
AD-627 952 FLD. 6/3
(AFOSR-69-2819)
AD-627 754 FLD. 5/10

•AF-EOAR-4-65
GENOA UNIV (ITALY) CLINICA NEUROCHIRURGICA
(AFOSR-69-2012)
F AD-627 479 FLD. 6/16

•AF-EOAR-5-64
LUND UNIV (SWEDEN)
(AFOSR-69-2512)
AD-627 913 FLD. 6/16

•AF-EOAR-9-64
MILAN UNIV (ITALY) ISTITUTO DI CHIMICA GENERALE
(AFOSR-69-2717)
F AD-627 812 FLD. 7/2

•AF-EOAR-12-63
LUND UNIV (SWEDEN) DEPT OF PHARMACOLOGY
(AFOSR-69-2515)
AD-627 621 FLD. 6/16

•AF-EOAR-12-65
VON KARMAN INST FOR FLUID DYNAMICS RHODE-SAINT-GENESE (BELGIUM)
(AFOSR-69-2940)
F AD-627 695 FLD. 20/4

•AF-EOAR-13-63
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
(AFOSR-69-2721)
F AD-627 894 FLD. 5/10

•AF-EOAR-17-63
LEICESTER UNIV (ENGLAND) DEPT OF BIOCHEMISTRY
(AFOSR-69-2916)
AD-627 625 FLD. 6/1

•AF-EOAR-18-63
UNIVERSITY COLL GALWAY (EIRE) DEPT OF BIOCHEMISTRY
(AFOSR-69-2691)
F AD-628 032 FLD. 6/1

•AF-EOAR-20-65
BRUSSELS UNIV (BELGIUM)
(AFOSR-69-2040)
AD-627 942 FLD. 6/1

•AF-EOAR-23-63
EDWARD DAVIES CHEMICAL LAB UNIV COLL OF WALES ABERYSTWYTH
(AFOSR-69-2886)
F AD-627 816 FLD. 7/3
(AFOSR-69-2497)
AD-627 833 FLD. 7/3

•AF-EOAR-29-63
PISA UNIV (ITALY)
(AFOSR-69-2731)
AD-627 990 FLD. 12/1
(AFOSR-69-2733)
AD-627 767 FLD. 12/1
(AFOSR-69-2732)
AD-627 768 FLD. 12/1
(AFOSR-69-2696)
AD-627 990 FLD. 12/1

•AF-EOAR-30-63
LONDON UNIV (ENGLAND) INST OF LARYNGOLOGY AND OTOLOGY
(AFOSR-69-2519)
AD-627 624 FLD. 6/3

•AF-EOAR-30-64
GOTEBORG UNIV (SWEDEN)
AD-627 551 FLD. 6/16

•AF-EOAR-31-64
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
(AFOSR-69-2922)
AD-627 548 FLD. 6/16
(AFOSR-69-2923)
AD-627 549 FLD. 6/16

•AF-EOAR-32-64
OSLO UNIV (NORWAY) INST FOR THEORETICAL PHYSICS 27
(AFOSR-69-2755)
AD-627 723 FLD. 20/10

•AF-EOAR-37-64
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
(AFOSR-69-2011)
F AD-627 634 FLD. 6/16
(AFOSR-69-2966)
AD-627 933 FLD. 6/16

•AF-EOAR-38-64
PARMA UNIV (ITALY) INST OF HUMAN PHYSIOLOGY
(AFOSR-69-2967)
AD-627 947 FLD. 6/16

•AF-EOAR-42-65
PISA UNIV (ITALY)
(AFOSR-69-2643)
AD-627 732 FLD. 12/1

•AF-EOAR-52-65
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
(AFOSR-69-2091)
AD-627 473 FLD. 6/15
(AFOSR-69-2090)
AD-627 476 FLD. 6/15

•AF-EOAR-55-64
FLORENCE UNIV (ITALY) INST OF ZOOLOGY
(AFOSR-69-2010)
AD-627 904 FLD. 6/3

•AF-EOAR-56-65
GOTEBORG UNIV (SWEDEN) DEPT OF PHARMACOLOGY
(AFOSR-69-2044)
AD-627 993 FLD. 6/16

•AF-EOAR-57-65
BRUSSELS UNIV (BELGIUM)
(AFOSR-69-2968)
AD-627 941 FLD. 6/16

•AF-EOAR-59-63
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL) DEPT OF BIOPHYSICS
(AFOSR-69-2170)
AD-627 985 FLD. 6/3
(AFOSR-69-2173)
AD-627 986 FLD. 6/1

•AF-EOAR-61-9
UNIVERSITY COLL CORK (EIRE)
(AFOSR-69-2043)
AD-627 964 FLD. 20/11

•AF-EOAR-61-94
LUND UNIV (SWEDEN)
(AFOSR-69-2844)
AD-627 746 FLD. 6/16

•AF-EOAR-62-7
TRIESTE UNIV (ITALY)
(AFOSR-69-2436)
AD-627 769 FLD. 12/1

•AF-EOAR-62-13
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
(AFOSR-69-2730)
AD-627 825 FLD. 7/4

•AF-EOAR-62-16
BRUSSELS UNIV (BELGIUM)
(AFOSR-69-2778)
AD-627 939 FLD. 20/9

•AF-EOAR-62-17
BRUSSELS UNIV (BELGIUM)
(AFOSR-69-2742)
AD-627 766 FLD. 13

•AF-EOAR-62-40
ERLANGEN UNIV (GERMANY)
(AFOSR-69-2972)
AD-627 547 FLD. 12/1

•AF-EOAR-62-43
UNIVERSITY COLL CORK (EIRE)
(AFOSR-69-2042)
AD-627 964 FLD. 20/11

•AF-EOAR-62-69
LEICESTER UNIV (ENGLAND) DEPT OF CHEMISTRY
(AFOSR-69-1938-PT-1)
F AD-627 274 FLD. 7/4

•AF-EOAR-62-80
OXFORD UNIV (ENGLAND) DEPT OF PHARMACOLOGY
(AFOSR-69-2961)
AD-627 851 FLD. 6/1

•AF-EOAR-62-107
LOUVAIN UNIV (BELGIUM) INSTITUT DE MECANIQUE APPLIQUEE
(AFOSR-69-2427)
AD-627 559 FLD. 20/11

•AF-EOAR-63-91
BRUSSELS UNIV (BELGIUM)
(AFOSR-66-0158)
AD-628 028 FLD. 20/8

•AF-EOAR-65-63
FREIE UNIVERSITAET BERLIN (WEST GERMANY) PHYSIOLOGISCHES

INSTITUT
(AFOSR-69-2965)
AD-627 952 FLD. 6/16

•AF-EOAR-70-69
HEBREW UNIV JERUSALEM (ISRAEL)
DEPT OF PHYSICS
(AFOSR-69-2953)
AD-627 756 FLD. 7/4

•AF-EOAR-71-69
TECHNION - ISRAEL INST OF TECH
HAIFA DEPT OF MECHANICS
(AFOSR-69-2758)
F AD-627 697 FLD. 12/1

•AF-EOAR-87-67
NATIONAL ELECTROTECHNICAL INST
TURIN (ITALY)
TN-5
(AFOSR-69-2098)
AD-627 470 FLD. 20/12

•ARPA ORDER-180-61
PENNSYLVANIA STATE UNIV UNIVERSITY
PARK DEPT OF GEOLOGY AND
GEOPHYSICS
A AD 627 373 FLD. 8/11

•ARPA ORDER-189-61
RAND CORP SANTA MONICA CALIF
RM-4809-ARPA
AD-627 645 FLD. 17/1
RM-4788-ARPA
AD-627 885 FLD. 20/9

•ARPA ORDER-296
STANFORD UNIV CALIF
(AFOSR-69-2013)
F AD-627 658 FLD. 10/1

•ARPA ORDER-396
GENERAL APPLIED SCIENCE LABS INC
WESTBURY N Y
GASL-TR-549
AD-627 474 FLD. 20/4

•ARPA ORDER-454
ILLIN IS UNIV URBANA GROUP
EFF'CTIVENESS RESEARCH LAB
TR-29
AD-627 359 FLD. 5/10
TR-28
AD-627 360 FLD. 5/10

•ARPA ORDER-517
ARMY ELECTRONICS COMMAND FORT
MONMOUTH N J
ECOM-2655
AD-628 042 FLD. 9/1

•AT(11-1)-1198
ILLINOIS UNIV URBANA DEPT OF
CHEMISTRY AND CHEMICAL
ENGINEERING
AD-627 281 FLD. 20/12

•AT(30-1)-3926
CORNELL UNIV ITHACA N Y DEPT OF
CHEMISTRY
(AFOSR-69-2956)
AD-627 982 FLD. 20/8

•AT(30-1)-3947
PITMAN-DUNN RESEARCH LABS FRANKFORD
ARSENAL PHILADELPHIA PA
(FA-A69-10)
AD-627 342 FLD. 20/2

•AT(49-2)-1167
NAVAL RADIOLOGICAL DEFENSE LAB SAN
FRANCISCO CALIF
USNRDL-TR-948
AD-627 568 FLD. 18/2

•DA-04-200-AMC-791(X)
CALIFORNIA UNIV BERKELEY DEPT OF
MECHANICAL ENGINEERING
TS-69-4
AD-627 409 FLD. 21/2

•DA-11-022-ORD-2059
MATHEMATICS RESEARCH CENTER UNIV OF
WISCONSIN MADISON
WIS-TCI-199
AD-627 396L FLD. 20/10

•DA-18-108-CML-6972
LEVER BROTHERS CO EDGEWATER N J
F AD-627 810 FLD. 6/16

•DA-19-020-ORD-5589
LITTLE (ARTHUR D) INC CAMBRIDGE
MASS
(AROD-006:12)
AD-627 315 FLD. 7/4

•DA-19-129-AMC-151(N)
MONSANTO RESEARCH CORP DAYTON OHIO
AD-628 001 FLD. 11/10
AD-628 002 FLD. 11/10
AD-628 003 FLD. 11/10

•DA-28-043-AMC-00073(E)
ILLINOIS UNIV URBANA COORDINATED
SCIENCE LAB
R-273
AD-627 903 FLD. 20/14
R-277
AD-627 974 FLD. 9/2

•DA-28-043-AMC-00099(E)
JOHNS HOPKINS UNIV BALTIMORE MD
DEPT OF PHYSICS
TR-2
AD-627 614 FLD. 20/9

•DA-28-043-AMC-00350(E)
VARIAN ASSOCIATES BEVERLY MASS
AD-627 601 FLD. 9/1

•DA-28-043-AMC-00436(E)
SILICONIX INC SUNNYVALE CALIF
F AD-627 334 FLD. 9/1

•DA-28-043-AMC-00443(E)
MIAMI UNIV CORAL GABLES FLA INST
OF MARINE SCIENCE
8188-1
AD-627 359 FLD. 4/2

•DA-28-043-AMC-00454(E)
RADIO CORP OF AMERICA CAMDEN N J
COMMUNICATIONS SYSTEMS DIV
AD-627 914 FLD. 9/5

•DA-28-043-AMC-01204(E)
MOTOROLA INC SCOTTSDALE ARIZ
MILITARY ELECTRONICS DIV
WP-3081-1
AD-627 528 FLD. 17/9
WP-3081-2
AD-627 932 FLD. 17/9

•DA-28-043-AMC-01240(E)
LOWELL TECHNOLOGICAL INST RESEARCH
FOUNDATION MASS
18
AD-627 711 FLD. 20/2

•DA-28-043-AMC-01268(E)
ZENITH RADIO RESEARCH CORP MENLO
PARK CALIF
(ECOM-01268-2)
AD-627 912 FLD. 9/1

•DA-28-043-AMC-01273(E)
ARACON GEOPHYSICS CO CONCORD MASS
9621-7
(ECOM-02173-2)
AD-627 992 FLD. 4/2

•DA-28-043-AMC-01304(E)
PENNSYLVANIA STATE UNIV UNIVERSITY
PARK MATERIALS RESEARCH LAB
AD-627 906 FLD. 20/2
AD-627 968 FLD. 20/2

•DA-28-043-AMC-01320(E)
MARTIN CO ORLANDO FLA
OR-6825
AD-627 992 FLD. 9/5

•DA-28-043-AMC-01344(E)
UNION CARBIDE CORP PARMA OHIO
RESEARCH LAB
6
AD-627 606 FLD. 10/2

•DA-28-043-AMC-01375(E)
UNION CARBIDE CORP PARMA OHIO
(ECOM-01375-1)
AD-627 337 FLD. 10/2

•DA-28-043-AMC-01389(E)
FAIRCHILD HILLER CORP BLADENSBURG
MD ELECTRONIC AND INFORMATION
SYSTEMS DIV
(ECOM-01389-1)
AD-627 993 FLD. 9/5

•DA-28-043-AMC-01479(E)
FREQUENCY ELECTRONICS INC ASTORIA
N Y
(ECOM-01479-1)
AD-627 271 FLD. 9/5

•DA-31-124-ARO(D)-109
FRICK CHEMICAL LAB PRINCETON UNIV
N J
(AROD-2364:20)
AD-627 499 FLD. 7/4

•DA-31-124-ARO(D)-207
NORTH CAROLINA STATE UNIV RALEIGH
DEPT OF ENGINEERING RESEARCH
TR-4
(AROD-4932:1)
AD-628 005 FLD. 13/8

•DA-31-124-ARO(D)-277
MELPAR INC FALLS CHURCH VA
(AROD-5727:1)
AD-627 526 FLD. 20/2

•DA-31-124-AROD-102
CARLYLE BARTON LAB JOHNS HOPKINS
UNIV BALTIMORE MD
(AROD-4194:4)
AD-627 348 FLD. 20/12

•DA-31-124-AROD-109
FRICK CHEMICAL LAB PRINCETON UNIV
N J
(AROD-2364:19)
AD-627 498 FLD. 7/4
(AROD-2364:21)
AD-627 500 FLD. 7/4
(AROD-2364:22)
AD-627 501 FLD. 7/4
(AROD-2364:23)
AD-627 502 FLD. 7/4
(AROD-2364:15)
AD-627 503 FLD. 7/4
(AROD-2364:16)
AD-627 504 FLD. 7/4

•DA-36-039-AMC-01462(E)
RADIO CORP OF AMERICA CAMDEN N J
COMMUNICATIONS SYSTEMS DIV
AD-628 012 FLD. 9/3

•DA-36-039-AMC-02169(E)
CALIFORNIA UNIV BERKELEY
ELECTRONICS RESEARCH LAB
AD-627 969 FLD. 9/5

•DA-36-039-AMC-02169(E)
RENSSELAER POLYTECHNIC INST TROY N
Y
AD-627 392 FLD. 20/12
A AD-627 393 FLD. 20/12

•DA-36-039-AMC-02282(E)
BENDIX CORP DAVENPORT IOWA PIONEER-
CENTRAL DIV
PUB-3919-65
AD-627 684 FLD. 9/5

•DA-36-039-AMC-02324(E)
TEXAS INSTRUMENTS INC DALLAS
SEMICONDUCTOR-COMPONENTS DIV
TI-03-65-112
AD-627 849 FLD. 9/1

210-195 O - 66 - 15

AD-627 850 FLD. 9/1

•DA-36-039-AMC-03297(E)
STANFORD RESEARCH INST MENLO PARK CALIF
SRI-R-21
AD-627 339 FLD. 9/2

•DA-36-039-AMC-03634(E)
LINDEN LABS INC STATE COLLEGE PA
AD-628 013 FLD. 13/8

•DA-36-039-AMC-06158(E)
MOTOROLA INC PHOENIX ARIZ
SEMICONDUCTOR PRODUCTS DIV
AD-627 946 FLD. 9/5

•DA-36-039-AMC-06162(E)
BOMAC DIV VARIAN ASSOCIATES BEVERLY MASS
AD-627 529 FLD. 9/1

•DA-36-039-AMC-06169(E)
MOTOROLA INC PHOENIX ARIZ
SEMICONDUCTOR PRODUCTS DIV
AD-627 823 FLD. 9/1

•DA-36-039-SC-85973
CTS KNIGHTS INC SANDWICH ILL
AD-627 331 FLD. 9/1

•DA-36-039-SC-85976E
CTS CORP ELKHART IND RESEARCH AND DEVELOPMENT DIV
AD-627 913 FLD. 9/1

•DA-36-039-SC-90789
COLUMBIA RADIATION LAB NEW YORK
T-9
AD-627 579 FLD. 20/5

•DA-49-089-AMC-129(T)
BAUSCH AND LOMB INC ROCHESTER N Y
RESEARCH AND DEVELOPMENT DIV
AD-627 333 FLD. 20/6

•DA-49-089-AMC-930(T)
HOLMAN (JOHN F) CO INC WASHINGTON D C
T-1818-65
(TT-66-60492)
AD-627 538 FLD. 20/14
(AERDL-T-1816-66)
AD-627 721 FLD. 8/5
(AERDL-T-1819-66)
AD-627 722 FLD. 17/7

•DA-49-089-AMC-1068(T)
UNITED STATES RUBBER CO WAYNE N J
RESEARCH CENTER
AD-627 540 FLD. 11/1

•DA-49-177-AMC-81(T)
PRINCETON UNIV N J DEPT OF AEROSPACE AND MECHANICAL SCIENCES
AEROSPACE/MECHANICAL SCI-709
(USAAVLABS-TR-65-98)
AD-627 370 FLD. 1/2

•DA-49-177-AMC-150(T)
LOCKHEED-CALIFORNIA CO BURBANK
LR-18917
(USAAVLABS-TR-65-71)
F AD-627 372 FLD. 1/2

•DA-49-177-AMC-155(T)
KAMAN AIRCRAFT CORP BLOOMFIELD CONN ELECTRONIC SYSTEMS DIV
KAMAN R-565
F AD-627 369 FLD. 1/3

•DA-49-177-AMC-169(T)
OKLAHOMA UNIV RESEARCH INST NORMAN
F AD-627 362 FLD. 11/9

•DA-49-177-AMC-877(T)
HUGHES TOOL CO CULVER CITY CALIF AIRCRAFT DIV
HTC-AD-69-26 (389-T-16)
(USAAVLABS-TR-65-38)

S AD-627 361 FLD. 1/3

•DA-49-188-ARO-1
RESEARCH ANALYSIS CORP MCLEAN VA
RAC-TP-182
AD-627 418 FLD. 5/1

•DA-49-188-ARO-2
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
HUMRRO-TR-65-13
AD-627 394 FLD. 5/10

•DA-49-146-XZ-923
MEDICAL COLL OF VIRGINIA RICHMOND
(DASA-1687)
AD-627 338 FLD. 6/5

•DA-49-193-MD-2060
ILLINOIS UNIV URBANA GROUP EFFECTIVENESS RESEARCH LAB
A AD-627 794 FLD. 5/10

•DA-49-193-MD-2238
MARYLAND UNIV COLLEGE PARK DEPT OF ZOOLOGY
AD-627 336 FLD. 6/3

•DA-ARO(D)-31-124-G665
MICHIGAN UNIV ANN ARBOR COLL OF LITERATURE SCIENCE AND THE ARTS
ORA-03105-42-T
AD-627 682 FLD. 12/1
03105-41-T
AD-627 760 FLD. 9/2

•DA-AROD-31-124-G942
CHICAGO UNIV ILL
(AROD-9189-6)
AD-627 457 FLD. 20/1

•DRB-800107/200024
DALHOUSIE UNIV HALIFAX (NOVA SCOTIA)
AD-627 458 FLD. 20/2

•E-201
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
AD-627 718 FLD. 6/5

•N60NR-226(08)
TEXAS UNIV AUSTIN DEPT OF PHYSICS
TR-10
AD-627 888 FLD. 20/11

•N600(19)61270
MASSACHUSETTS INST OF TECH CAMBRIDGE
MIT-DSR-9139
AD-628 019 FLD. 20/4

•N61339-1990
WESTINGHOUSE ELECTRIC CORP ELMIRA N Y ELECTRONIC TUBE DIV
AD-627 426 FLD. 20/6

•NASA-R-87
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
AMRL-TR-65-122
F AD-627 391 FLD. 6/20

•NASW-849
RIAS INC BALTIMORE MD
(AFOSR-65-2935)
AD-627 563 FLD. 12/2

•NBY-62172
MCCLELLAN (ROBERT B) CANOGA PARK CALIF
F AD-627 330 FLD. 5/9
F AD-627 599 FLD. 5/9

•NIH-NB-05236-01
GOTEBORG UNIV (SWEDEN) DEPT OF PHARMACOLOGY
(AFOSR-65-2044)
AD-627 493 FLD. 6/16

•NOBSR-87922
ROTRON MFG CO WOODSTOCK N Y
F AD-627 674 FLD. 13/9

•NOBSR-89167
SOUTHWEST RESEARCH INST SAN ANTONIO TEX
AD-627 478 FLD. 17/3

•NOBSR-89919
LINDE DIV UNION CARBIDE CORP GREENVILLE S C
AD-627 321 FLD. 9/1

•NOBSR-91199
LABORATORY FOR ELECTRONICS INC BOSTON MASS
480-Q5
AD-627 696 FLD. 9/2

•NOBSR-91236
ITT FEDERAL ELECTRIC CORP PARAMUS N J
F AD-627 675 FLD. 20/14
F AD-627 676 FLD. 17/2.1

•NOBSR-93266
MICROWAVE ASSOCIATES INC BURLINGTON MASS
AD-627 997 FLD. 9/5

•NONR-220(99)
CALIFORNIA INST OF TECH PASADENA HYDRODYNAMICS LAB
E-115.1
F AD-627 929 FLD. 20/4

•NONR-220(50)
CALIFORNIA INST OF TECH PASADENA
TR-28
AD-627 681 FLD. 20/9

•NONR-222(51)
CALIFORNIA UNIV SAN FRANCISCO MEDICAL CENTER
AD-627 882 FLD. 6/5

•NONR-222(83)
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY
ORC-65-34
AD-627 297 FLD. 14/1

•NONR-225(52)
STANFORD UNIV CALIF DEPT OF STATISTICS
TR-113
AD-627 389 FLD. 5/4

•NONR-255(67)
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
HEPL-420
AD-627 517 FLD. 20/8

•NONR-266(72)
NEVIS LABS COLUMBIA UNIV IRVINGTON-ON-HUDSON N Y
R-536
AD-627 351 FLD. 20/7

•NONR-266(78)
COLUMBIA UNIV NEW YORK DEPT OF CIVIL ENGINEERING AND ENGINEERING MECHANICS
TR-28
AD-627 691 FLD. 21/9.2
TR-32
AD-627 692 FLD. 20/11

•NONR-266(93)
COLUMBIA UNIV NEW YORK PLASMA LAB
34
AD-627 363 FLD. 20/5

•NONR-285(55)
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y
IMM-349
AD-627 433 FLD. 20/4

•NONR-401(26)
FLOYD NEWMAN LAB OF NUCLEAR STUDIES
CORNELL UNIV ITHACA N Y
AD-627 324 FLD. 20/7

•NONR-434(02)
MEDICAL COLL OF SOUTH CAROLINA
CHARLESTON DEPT OF SURGERY
AD-627 755 FLD. 6/5

•NONR-477(33)
WASHINGTON UNIV SEATTLE
AD-627 437 FLD. 9/10

•NONR-562(36)
BROWN UNIV PROVIDENCE R I DIV OF
APPLIED MATHEMATICS
AD-627 429 FLD. 20/13

•NONR-624(14)
PITTSBURGH UNIV PA GRADUATE
SCHOOL OF BUSINESS
TR-10
AD-627 648 FLD. 5/1

•NONR-988(10)
FLORIDA STATE UNIV TALLAHASSEE
INST OF MOLECULAR BIOPHYSICS
BSCS-PAMPLETS-24
(AFOSR-65-2976)
AD-627 950 FLD. 6/1

•NONR-1147(07)
COLORADO UNIV BOULDER
TR-15
AD-627 590 FLD. 9/10

•NONR-1202(07)
WISCONSIN UNIV MADISON DEPT OF
METEOROLOGY
TR-22
AD-627 531 FLD. 4/2
TR-23
AD-627 532 FLD. 4/2

•NONR-1224(21)
MICHIGAN UNIV ANN ARBOR COLL OF
LITERATURE SCIENCE AND THE ARTS
ORA-03105-42-T
AD-627 682 FLD. 12/1
03105-41-T
AD-627 760 FLD. 9/2

•NONR-1224(26)
MICHIGAN UNIV ANN ARBOR
F AD-627 574 FLD. 6/16
MICHIGAN UNIV ANN ARBOR , DEPT OF
PHARMACOLOGY
AD-627 752 FLD. 6/19
AD-627 753 FLD. 6/19
MICHIGAN UNIV ANN ARBOR DEPT OF
PHYSIOLOGY
AD-627 576 FLD. 6/3
AD-627 772 FLD. 6/16

•NONR-1224(54)
MICHIGAN UNIV ANN ARBOR
AD-627 266 FLD. 14/5

•NONR-1228(32)
NORTHWESTERN UNIV EVANSTON ILL
DEPT OF MATERIALS SCIENCE
TR-2
AD-627 811 FLD. 20/11

•NONR-1834(13)
ILLINOIS UNIV URBANA DEPT OF
CHEMISTRY AND CHEMICAL
ENGINEERING
TR-87
AD-627 391 FLD. 7/2

•NONR-1834(22)
ILLINOIS UNIV URBANA ELECTRICAL
ENGINEERING RESEARCH LAB
AD-627 535 FLD. 9/2

•NONR-1834(36)
ILLINOIS UNIV URBANA GROUP
EFFECTIVENESS RESEARCH LAB
TR-26
AD-627 358 FLD. 5/10
TR-29
AD-627 359 FLD. 5/10
TR-28
AD-627 360 FLD. 5/10

•NONR-1834(38)
ILLINOIS UNIV URBANA DEPT OF
CERAMIC ENGINEERING
TR-2
AD-627 749 FLD. 20/2

•NONR-1834(05)
ILLINOIS UNIV URBANA DEPT OF
CHEMISTRY AND CHEMICAL
ENGINEERING
AD-627 281 FLD. 20/12

•NONR-1841(91)
MASSACHUSETTS INST OF TECH
CAMBRIDGE GAS TURBINE LAB
81
AD-627 428 FLD. 20/4

•NONR-1866(14)
MALLINCKRODT CHEMICAL LAB HARVARD
UNIV CAMBRIDGE MASS
AD-627 815 FLD. 20/6

•NONR-1866(16)
CRUFT LAB HARVARD UNIV CAMBRIDGE
MASS
TR-486
AD-627 696 FLD. 12/2
TR-492
AD-627 697 FLD. 12/2

•NONR-1866(98)
HARVARD COLL OBSERVATORY CAMBRIDGE
MASS
SCIENTIFIC-9
AD-627 612 FLD. 7/4

•NONR-2173(10)
ARIZONA UNIV TUCSON
F AD-627 841 FLD. 6/5

•NONR-2196(00)
WOODS HOLE OCEANOGRAPHIC
INSTITUTION MASS
REF-65-50
(NYO-2174-38)
AD-627 527 FLD. 8/10

•NONR-2216(11)
CALIFORNIA UNIV LA JOLLA
TR-37
AD-627 390 FLD. 20/12
TR-38
AD-627 577 FLD. 20/12

•NONR-2252(01)
HOFSTRA UNIV HEMPSTEAD N Y DEPT
OF PSYCHOLOGY
AD-627 758 FLD. 5/10

•NONR-3387(00)
DECO ELECTRONICS INC BOULDER COLO
30-P-10
AD-627 665 FLD. 8/7

•NONR-3591(01)
BUCKNELL UNIV LEWISBURG PA DEPT
OF PSYCHOLOGY
A AD-627 596 FLD. 5/10

•NONR-3608(00)
NATIONAL RESEARCH CORP CAMBRIDGE
MASS NORTON EXPLORATORY RESEARCH
DIV
A AD-627 656 FLD. 7/4

•NONR-3656(13)
CALIFORNIA UNIV BERKELEY
(AFOSR-69-2787)
AD-627 759 FLD. 4/1

•NONR-3694(01)
CLARK UNIV WORCESTER MASS
AD-627 709 FLD. 20/12

•NONR-3732(00)
INSTITUTE OF NAVAL STUDIES
CAMBRIDGE MASS
INS-RESEARCH-CONTRIBUTION-14
F AD-627 952 FLD. 17/2.1
OPERATIONS EVALUATION GROUP
WASHINGTON D C
RESEARCH CONTRIBUTION-69
AD-627 680 FLD. 17/9

•NONR-3748(03)
HAWAII INST OF GEOPHYSICS HONOLULU
HIG-65-15
AD-627 799 FLD. 8/10

•NONR-3815(00)
AMPEX CORP REDWOOD CITY CALIF
RR-65-14
AD-628 021 FLD. 13/9

•NONR-3949(00)
PERSONNEL RESEARCH CENTER INC
DETROIT MICH
TR-396
AD-627 926 FLD. 5/9

•NONR-3963(16)
MASSACHUSETTS INST OF TECH
CAMBRIDGE
TR-1
AD-627 910 FLD. 20/3
TR-2
AD-627 911 FLD. 14/2

•NONR-4010(10)
JOHNS HOPKINS UNIV BALTIMORE MD
DEPT OF PHYSICS
TR-2
AD-627 614 FLD. 20/9

•NONR-4028(00)
POMONA COLL CLAREMONT CALIF
F AD-627 909 FLD. 6/1

•NONR-4029(00)
WOODS HOLE OCEANOGRAPHIC
INSTITUTION MASS
REF-65-50
(NYO-2174-38)
AD-627 927 FLD. 8/10

•NONR-4102(01)
MASSACHUSETTS INST OF TECH
CAMBRIDGE
MAC-TR-29
AD-627 537 FLD. 9/2
AD-627 782 FLD. 9/1

•NONR-4210(00)
SOCIAL SCIENCE RESEARCH COUNCIL NEW
YORK
F AD-627 595 FLD. 5/10

•NONR-4227(00)
INTERSTATE ELECTRONICS CORP
ANAHEIM CALIF OCEANICS DIV
F AD-627 936 FLD. 14/2

•NONR-4252(01)
EMORY UNIV ATLANTA GA
AD-627 863 FLD. 5/10

•NONR-4259(10)
COLUMBIA RADIATION LAB NEW YORK
TR-9
AD-627 579 FLD. 20/5

•NONR-4309(00)
HUNTER COLL OF THE CITY UNIV OF NEW
YORK
TR-5
AD-627 927 FLD. 5/10

•NONR-4333(00)
OPTICS TECHNOLOGY INC BELMONT
CALIF
(AFOSR-65-1977)
AD-627 956 FLD. 20/5

•NONR-4336(00)
DELAWARE UNIV NEWARK DEPT OF

PHYSICS
TR-5
AD-628 022 FLD. 13/8

•NONR-4484(00)
LITTLE (ARTHUR D) INC CAMBRIDGE MASS
TR-19
AD-627 356 FLD. 7/4

•NONR-4487(00)
DECISION STUDIES GROUP PALO ALTO CALIF
AD-627 265 FLD. 15/5

•NONR-4488(00)
HUGHES AIRCRAFT CO CULVER CITY CALIF RESEARCH AND DEVELOPMENT DIV
TR-2732.01/90
F AD-627 669 FLD. 1/4

•NONR-4489(00)
HEMODYNAMICS RESEARCH INC MORRISTOWN N J
F AD-627 510 FLD. 6/16

•NONR-4514(00)
GENERAL ELECTRIC CO JOHNSON CITY N Y LIGHT MILITARY ELECTRONICS DEPT
LMEJ-7713
F AD-627 664 FLD. 17/8

•NONR-4679(00)
STATE UNIV OF NEW YORK BUFFALO
TR-2
AD-627 949 FLD. 9/10
TR-1
AD-627 980 FLD. 9/10

•NONR-4717(00)
SPACE-GENERAL CORP EL MONTE CALIF
SGC-829R-2
AD-627 667 FLD. 8/12

•NONR-4959(00)
URS CORP BURLINGAME CALIF
URS-654-2
F AD-627 354 FLD. 20/4

•NONR(G)00036-65
ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA PA
F AD-627 263 FLD. 8/10

•NONR(G)-00096-65
COLOR DO UNIV BOULDER DEPT OF AST-O-GEOPHYSICS
F AD-627 689 FLD. 3/2

•NORD-7386
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
TG-901-VOL-1
AD-627 364 FLD. 22/3
TG-901-VOL-2
AD-627 365 FLD. 22/3
TG-397
AD-627 398 FLD. 5/1
TG-321
AD-627 399 FLD. 9/2
TG-389
AD-627 900 FLD. 5/10
TG-359
AD-627 902 FLD. 15/7
APL/JHU-TG-352
AD-627 907 FLD. 15/3.1
TG-367
AD-627 911 FLD. 15/7
TG-360
AD-627 912 FLD. 9/2
TG-938
AD-627 914 FLD. 22/3
TG-363
AD-627 919 FLD. 9/2
TG-918
AD-627 921 FLD. 13/12
TG-398
AD-627 922 FLD. 9/2
TG-937
AD-627 923 FLD. 20/4
TG-361
AD-627 940 FLD. 5/10
TG-395-1
AD-627 941 FLD. 21/2

•NORD-9195
ELECTRICAL ENGINEERING RESEARCH LAB UNIV OF TEXAS AUSTIN
EERL-3-13
AD-627 607 FLD. 9/1

•NORD-16498
ELECTRICAL ENGINEERING RESEARCH LAB UNIV OF TEXAS AUSTIN
EERL-3-20
AD-627 939 FLD. 20/14
CM-894
F AD-627 603 FLD. 20/14
CM-895
AD-627 604 FLD. 20/14

•NORD-16899
MICHIGAN UNIV ANN ARBOR DEPT OF AERONAUTICAL AND ASTRONAUTICAL ENGINEERING
03992-15-T
AD-627 609 FLD. 20/4

•NOW-62-0604
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
TG-371-5
AD-627 397 FLD. 21/9.2

•NOW-62-0604-C
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
TG-371-7
AD-627 901 FLD. 21/9.2
TG-911-2
AD-627 908 FLD. 5/1
TG-376-6
AD-627 910 FLD. 21/2
TG-371-6
AD-627 915 FLD. 21/8.2
TG-942
AD-627 916 FLD. 4/1
TG-376-9
AD-627 950 FLD. 21/2
TG-371-48
AD-627 991 FLD. 21/9.2
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
(AFOSR-65-2025)
AD-627 620 FLD. 20/3

•NOW-64-0306-C
HYDRONAUTICS INC LAUREL MD
TR-515-1
AD-627 392 FLD. 13/10

•NOW-65-0344-C
HYDRONAUTICS INC LAUREL MD
TR-519-1
AD-627 392 FLD. 13/10

•NOW-65-0577-D
GPL DIV GENERAL PRECISION INC PLEASANTVILLE N Y
GPL-A-33-2
AD-628 017 FLD. 17/7

•NSF-G-308
LINGUISTICS RESEARCH CENTER UNIV OF TEXAS AUSTIN
LRC-65-NT-2
AD-627 791 FLD. 5/2

•NSF-G2495
MINNESOTA UNIV MINNEAPOLIS
(AFOSR-65-2631)
AD-627 980 FLD. 12/1

•NSF-G-15983
PISA UNIV (ITALY)
(AFOSR-65-2731)
AD-627 550 FLD. 12/1

•NSF-G24910
GEORGIA UNIV ATHENS DEPT OF CHEMISTRY
(AFOSR-65-2760)
AD-627 828 FLD. 7/3
(AFOSR-65-2759)
AD-627 830 FLD. 7/3

•NSF-GB-4
ILLINOIS UNIV URBANA DEPT OF MICROBIOLOGY
AD-627 286 FLD. 6/13

•NSF-GK-690
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
R-277
AD-627 979 FLD. 9/2

•NSF-GN-308
LINGUISTICS RESEARCH CENTER UNIV OF TEXAS AUSTIN
LRC-65-NT-3
AD-627 789 FLD. 5/7

•NSF-GP-948
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
HEPL-420
AD-627 517 FLD. 20/8

•NSF-GP-1193
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
(AFOSR-65-2793)
AD-627 749 FLD. 20/8

•NSF-GP-2432
CHICAGO UNIV ILL
(AFOSR-65-2649)
AD-627 626 FLD. 12/1

•NSF-GP-2693
CHICAGO UNIV ILL
(AFOSR-65-2080)
AD-627 996 FLD. 20/13
CHICAGO UNIV ILL INST FOR THE STUDY OF METALS
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OTHER RESEARCH REPORTS AND RELATED MATERIAL

1. AERONAUTICS

AD-428 867 **Field 1C, 14D, 12B**
CFSTI Price: HC$5.00
ARINC Research Corp., Washington, D. C.
SYSTEM EFFECTIVENESS: CONCEPTS AND ANALYTICAL TECHNIQUES,
by Harold S. Balaban and Donald L. Costello. Jan 64, 171p Pub-267-01-7-419
Contract AF33 (657)-10594

Descriptors: (*Aircraft, Effectiveness), Optimization, Statistical processes, Probability, Operations research, Reliability, Programming (Computers), Maintainability.

Identifiers: Evaluation, FORTRAN, Figure-of-merit, Steady state.

A description is presented of concepts and techniques for evaluating system effectiveness, with emphasis on aircraft systems. The model framework for quantifying a probabilistic or expected-value figure of merit for effectiveness is given. This model framework is based on matrix representation of system-state probabilities, which are analyzed through the theory of Markov processes. Techniques for optimization are discussed. Several computer procedures and FORTRAN programs for system effectiveness evaluation are included. (Author)

AD-449 227 **Field 1A, 20K**
CFSTI Price: HC$1.00
Foreign Technology Div., Wright-Patterson AFB, Ohio.
ENGINEERING COLLECTION (SELECTED ARTICLES).
by R. D. Stepanov and K. K. Livanov. 27 Dec 63, 20p FTD-MT-63-136
TT 66-60324,
N64 33031
Edited machine trans. of Akademiya Nauk SSSR. Institut Mekhaniki. Inzhenernyi Sbornik v25 p92-103 1959.

Descriptors: (*Panels (Structural), Flutter), (*Supersonic flow, Panels (Structural)), Stability, Cylindrical bodies, Equations.

Contents: Flutter of cylindrical panels moving in a gas, and Stability of fastened panel in supersonic flow.

AD-449 228 **Field 1A**
CFSTI Price: HC$1.00
Foreign Technology Div., Wright-Patterson AFB, Ohio.
APPLICATION OF RIEMANN METHOD TO SOLUTION OF PROBLEM OF FLOWING AROUND OF THIN BODIES,
by N. M. Monakhov. 21 May 64, 13p FTD-MT-63-288
TT 66-60325,
N64 32599
Edited machine trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Aviatsionnaya Tekhnika (USSR) v5 n4 p27-35 1962.

Descriptors: (*Slender bodies, Supersonic flow), (*Supersonic flow, Mathematical analysis), Bodies of revoltuion, Perturbation theory.

The report considers flow around slender bodies of revolution at a small angle of incidence. Potentials of perturbations of longitudinal and transverse flows on the generatrix of the body are received with accuracy up to values of fifth and fourth orders of smallness relative to the thickness of the body. Determination of each potential is reduced to the solution of one integral equation of the type of Abel.

AD-452 353 **Field 1D, 17G**
CFSTI Price: HC$1.00
Naval Air Test Center, Patuxent River, Md.
FLIGHT EVALUATION OF SERVO-ALTIMETER DISPLAYS FOR THE AIR TRAFFIC CONTROL RADAR BEACON SYSTEM/IFF/MARK 12/SYSTEM (AIMS) PROGRAM.
Final rept.,
by Richard P. Lee. 23 Nov 64, 25p ST32-92R-64
Task RAV09P003
N65 17849

Descriptors: (*Altimeters, Display systems), Flight instruments, Servomechanisms, Transponders, Radar beacons, Identification systems, Air traffic control systems, Flight testing.

Identifiers: Mark-12 IFF systems.

The Counter-Drum-Pointer, Counter-Pointer, DrumPointer, and Three-Pointer altimeter presentations were evaluated by twenty-three Navy, Air Force and Army pilots to select the best display for altimeters to be used in airplanes operating above 18,000 feet as part of the AIMS program. The Counter-Drum-Pointer (CDP) was the first choice of 80% of the pilots. Deficiencies in the CDP altimeter presentation for which correction is mandatory are: lag in the standby mode of operation and insufficient differentiation between the thousand foot counter and the hundred foot drum. Deficiencies in the CDP altimeter presentation for which correction is desirable for improved service use are: drum obscuration when the pointer indicates 250 or 750 feet and possible misreading altitude by a thousand feet when pointer is between the 900 and 1,000 foot positions. The CDP altimeter presentation is recommended for the AIMS program when the mandatory category deficiencies are corrected. The flight profile questionnaire and flight simulator methods are recommended as required phases in the evaluation of flight displays. (Author)

AD-461 455 **Field 1C**
CFSTI Price: HC$4.00
General Electric Co., Cincinnati, Ohio. Advanced Engine and Technology Dept.
XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT.
Quarterly technical progress rept. no. 11, 16 May-15 Aug 64.
Oct 64, 133p
Contract DA-44-177-TC-715
See also AD-437 623.

Descriptors: (*Vertical take-off planes, Lift), (*Research planes, Flight testing), Wind tunnel models, Model tests, Take-off, Flutter, Vibration, Jet engines, Hovering.

Identifiers: V-5 aircraft.

The lateral control investigation was completed with the static load test successfully completed at San Diego, the necessary hardware manufactured and modification to aircraft number 2 completed, with Edwards vertical thrust stand plus flight testing verification of the increased lateral control power. Full scale wind tunnel testing was completed with aircraft number 1, and the aircraft returned to Edwards for preparation for flight test. Lift fan inlet vane failures were experienced during the wind tunnel tests, modifications designed, manufactured, and tested to establish a flight envelope. Potential longitudinal trim problems were seen during the wind tunnel, a horizontal tail slat and instrumentation boom for measuring tail angle of attack were designed and installed on aircraft number 2. The nose wheel shimmy investigation was completed and modifications accomplished to the aircraft which allowed successful conventional flights to commence May 25, 1964. Initial hover flights began on July 16, 1964. A J85 stall investigation was conducted as a result of several compressor stalls experienced during flight. At the end of this reporting period, two hover flights were successfully accomplished without stalls utilizing J85's in a 'stall-free' configuration. (Author)

AD-465 902 **Field 1B, 4B, 15G**
CFSTI Prices: HC$1.00 MF$0.50
Air Weather Service, Scott AFB, Ill.
OPERATIONS. WEATHER WARNINGS.
Air Weather Service manual.
9 Jul 65, 7p AWSM-55-8-Vol-3

Descriptors: (*Weather forecasting, Air Force operations), (*All-weather aviation, Weather forecasting), (*Tropical cyclones, Weather forecasting), Instruction manuals, Hurricane tracking, Marine meteorology, Pacific Ocean, Air Force training, Weather communications.

This volume states the procedures to be followed by 1st Weather Wing units for issuing weather warning advisories and point weather warnings, and includes typhoon/hurricane warning procedures. (Author)

AD-466 003 **Field 1A, 9B**
CFSTI Prices: HC$5.00 MF$1.00
General Applied Science Labs, Inc., Westbury, N. Y.
A FINITE DIFFERENCE METHOD SOLUTION OF NON-SIMILAR, EQUILIBRIUM AND NON-EQUILIBRIUM AIR, BOUNDARY LAYER EQUATIONS WITH LAMINAR AND TURBULENT VISCOSITY MODELS. PART II. COMPUTER PROGRAM AND SUPPLEMENT.
Final rept.,
by H. E. Gould and L. S. Galowin. 2 Feb 65, 163p Technical rept. TR-501
Contract SD-149, ARPA Order-396,
Proj. 8010/1210

Descriptors: (*Boundary layer, Numerical analysis), (*Programming (Computers), Boundary layer), Difference equations, Momentum, Energy, Nonequilibrium flow, Laminar boundary layer, Turbulent boundary layer, Oxygen, Nitrogen, Oxides, Nitrogen compounds, Electrons, Viscosity.

The report describes a program for the numerical solution by an explicit finite difference technique of the momentum, species conservation, and energy equations for an equilibrium or chemically reacting air boundary layer. Laminar and several turbulent viscosity models can be applied through the thickness of the boundary layer. Seven air species are included: O2, O, Na, N, NO, NO (+) and e (-). Laminar and turbulent effects in any of the equations can be selectively controlled by input indicators. The various viscosity models can be applied to the entire thickness of the boundary layer or the boundary layer can be divided into two segments and different viscosity models applied to each segment. Provision was also made for boundary layer swallowing of new inviscid streamlines. Properties along the inviscid streamline are computed to establish the varying streamwise outer edge conditions. (Author)

AD-467 446 **Field 1A, 20M**
CFSTI Prices: HC$2.00
ARO, Inc., Arnold Air Force Station, Tenn.
LOW DENSITY BOUNDARY LAYER CONTROL BY LIQUID HYDROGEN CYROPUMPING,
by W. N. MacDermott, R. E. Dix and B. H. Shirley. Aug 65, 30 p
Contract AF40 (600)-1200,
Proj. AF-7778,
Task 777805
AEDC TR-65-148,
N65 33727

Descriptors: (*Boundary layer control, Cryopumping), (*Cryopumping, Boundary layer control), Liquefied gases, Hydrogen, Density, Hypersonic nozzles, Heaters, Wind tunnels.

Thick boundary layers in a low density wind tunnel nozzle were reduced by applying suction on the diverging walls of the nozzle. Extremely high suction rates have been established by cryogenically pumping the boundary layer gas directly to

the wall. The experimental apparatus used in this study incorporates a 12-in. -diam hypersonic nozzle and a 16-in. primary liquid hydrogen cryopump with a pumping speed of 200,000 liters/sec. Comparison of pitot and static pressures measured in this nozzle with nitrogen at an upstream settling chamber temperature (To1) of 300K indicates a supersaturated isentropic flow regime bounded on the low pressure end by a merged boundary layer. This nozzle was also supplied with arc-heated nitrogen, and it was found that the wall cryopumping retains effectiveness at supply temperatures at least as high as 4000K, although for a lesser period of time and at lower efficiency. When operating this apparatus with an arc heater, evidence was found that there are some nitrogen atoms formed in the arc discharge which survive the expansion flow through the nozzle and are trapped on the cryogenic surfaces in atomic form. (Author)

AD-467 447 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
ARO, Inc., Arnold Air Force Station, Tenn.
COMBINED EFFECTS OF VISCOUS INTERACTION AND IDEAL SOURCE FLOW ON PRESSURE AND HEAT-TRANSFER DISTRIBUTIONS OVER HEMISPHERE CYLINDERS AT Mach 18.
by R. H. Eaves, Jr. and Clark H. Lewis. Jul 65, 32p
Contract AF40 (600)-1200,
Proj. AF-8953,
Task 895303
AEDC TR-65-158

Descriptors: (*Hypersonic flow, Cylindrical bodies), (*Cylindrical bodies, Hypersonic flow), Pressure, Heat transfer, Distribution, Viscosity, Wind tunnels.

The combined effects of ideal source flow and viscous interaction on the pressure and heat-transfer distributions over hemisphere-cylinders are presented, and a comparison is made with experimental data from two of the AEDC-VKF hotshot tunnels. Ideal gas characteristics solutions for the inviscid flow field over the hemisphere-cylinders were obtained for ideal source flow fields matched to the tunnel geometry. The inviscid and viscous (laminar boundary layer) flow fields were iterated, and the resulting pressure and heat-transfer distributions were compared with the experimental data. Ideal gas analyses made at M = 18 predicted pressure and heat-transfer distributions over a 4-in.-diam model in the 100-in. hotshot Tunnel F, and pressure distributions for a similar model in the 50-in. hotshot Tunnel H were found in reasonably good agreement with the experimental data. (Author)

AD-467 448 **Field 1A**
CFSTI Prices: HC$1.00 MF$0.50
ARO, Inc., Arnold Air Force Station, Tenn.
FORCE AND PRESSURE TESTS ON A SEMI-SPAN DELTA WING AT SUPERSONIC SPEEDS.
Technical rept.,
by Larry J. Pfaff. Aug 65, 23p
Contract AF40 (600)-1200,
Projs. AF-9781, ARO-VA-0545,
Task 978101
AEDC TR-65-165

Descriptors: (*Delta wings, Supersonic characteristics), (*Supersonic characteristics, Delta wings), Force (Mechanics), Pressure, Tests, Leading edge, Angle of attack, Hypersonic characteristics.

Static-force and pressure tests were conducted in a 40-in. supersonic tunnel on a 70-deg, blunt leading-edge, semi-span delta wing. The wing consisted of three sections, triangular forward and tip panels and a rectangular main panel. Tests were made with the forward panel deflected -2.5 deg and undeflected (flat wing). Force data on the total wing and pressure data on the tip panel were obtained at Mach numbers from 3 to 5; additional pressure data were obtained at Mach number 6. The angle-of-attack range was from -4 to 10 deg, and Reynolds number, based on the wing root chord, ranged from 9,000,000 at Mach number 3 to 18,000,000 at Mach number 6. Wing lift-to-drag ratio and tip panel pressure data are presented for the wing with the forward panel deflected and undeflected. (Author)

AD-468 283 **Field 1C, 13A**
CFSTI Prices: HC$3.00 MF$0.75
Naval Air Development Center, Johnsville, Pa. Aeronautical Instruments Lab.
AN EVALUATION OF RED ELECTROLUMINESCENT LAMPS.
Interim rept.,
by John W. Parker, III. 20 May 65, 80p
NADC-AI-6535
Task WEP-RAV09J012/2021/F012-04-05

Descriptors: (*Electroluminescence, Lighting equipment), (*Lighting equipment, Electroluminescence), State-of-the-art reviews, Colors, Aircraft, Instrumentation, Performance (Engineering).

Identifiers: Evaluation, Electroluminescent cells.

This report is an evaluation of red electroluminescent lamps, using the best obtainable lamps from numerous manufacturers. In the majority of cases, green phosphors were used with color conversion layers to obtain aviation red light. A number of tests were performed on the lamps, such as: brightness, color, current drain, voltage and frequency effects, life, high and low temperature exposure. The data were used to determine several characteristics of the electroluminescent lamps. The results indicate wide variations between manufacturers in overall lamp characteristics. (Author)

Patent 3,219,158 **Field 1C, 16D**
QUICK ATTACH PANEL FASTENER.
Patent assigned to Navy,
by Ralph E. Carter and George E. Myers. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Wings, Fastenings), (*Fastenings, Wings), (*Guided missiles, Wings), Aircraft, Patents.

The panel fastener is for attaching a wing member to an airborne vehicle. The wing members are usually attached to the missile body just prior to launching. The spring-loaded cantilevered wing coupling mechanism is mounted within the wing element which cooperates with mounting studs on the missile body.

PB-169 150 **Field 1B, 4B, 17G**
CFSTI Prices: HC$3.00 MF$0.50
National Aviation Facilities Experimental Center, Atlantic City, N. J. Test and Evaluation Div.
EVALUATION OF AIR TRAFFIC CONTROL RADAR WEATHER DATA.
Interim rept.,
by Anthony D. Bradley. Oct 65, 56p
Proj. 241-001-01V
SRDS RD-65-121

Descriptors: (*All-weather aviation, Meteorological radar), (*Meteorological radar, All-weather aviation), (*Air traffic control systems, All-weather aviation), Weather forecasting, Radar, Display systems, Aeronautics.

The ARSR Weather Surveillance System, Type FAA-ER-240-003, was designed to process weather information received as RF signals at the ARSR-1E antenna and present three distinct isoamplitude contours of the weather on the Air Traffic Controller's display. An investigation designed to examine the various aspects of the equipment's performance constituted the Technical Evaluation. The ATC Channel circular polarization punch-through level was measured along with the peak intensity of a storm. Contoured weather presentations were photographed and compared with the U.S. Weather Bureau WSR-57 information. It was concluded that a solid line contour, 7 db above the minimum discernible signal and the application of an MSTC-R (3) sensitivity variation with range, established an acceptable system performance level for presenting weather information. The ARSR Weather Surveillance System is suitable for use in conducting an Operational Evaluation. In addition, improvements can be achieved in several system areas. It was recommended that the Operational Evaluation proceed under established operating conditions. It was further recommended that improvements be accomplished in several system areas. (Author)

PB-169 151 **Field 1E, 14C, 17G**
CFSTI Prices: HC$2.00 MF$0.50
National Aviation Facilities Experimental Center, Atlantic City, N. J.
EVALUATION OF THE ASR VIDEO PHOTOGRAPHIC RECORDING TECHNIQUE.
Final rept.,
by G. Titherington. Aug 65, 34p
Proj. 231-003-01V
SRDS RD-65-99

Descriptors: (*Radar recording cameras, Terminal flight facilities), (*Terminal flight facilities, Radar recording cameras), (*Photographic recording systems, Air traffic control systems), (*Air traffic control systems, Photographic recording systems), Air traffic, Flight paths, Radar images, Recording systems, Display systems, Aeronautics.

The requirement for a practical means of recording air traffic history as derived from radar displays resulted in an evaluation of the photographic technique described in this report. The purpose of the evaluation was to determine whether the photographic technique was suitable for recording radar video data and whether the photographic record was adequate for subsequent re-creation of an air traffic situation. Data were obtained by photographing radar presentations at the John F. Kennedy Tower facility during periods of high air traffic activity. Reconstruction of the traffic situations using these photographic records was accomplished by air traffic controllers. This was done at the National Aviation Facilities Experimental Center (NAFEC) located in Atlantic City, New Jersey. Results of data analysis showed that the photographic recording technique incorporating particular equipments and procedures was suitable for recording radar video data and was adequate for re-creating air traffic situations. It was recommended that: (1) an investigation of support requirements be conducted to determine practicability of operational implementation; (2) consideration be given to development of a prototype system; and (3) specifications for prototype equipment include certain listed minimal criteria. (Author)

PB-169 194 **Field 1E, 13A**
CFSTI Prices: HC$4.00 MF$1.00
Melpar, Inc., Falls Church, Va.
DEVELOPMENT OF A PAVEMENT HEATING SYSTEM TO REMOVE SNOW FROM AIRPORT RUNWAY INSET LIGHTS.
Final rept.,
by J. L. Pentecost, J. E. Riley, A. F. Saphonchak, and D. H. Rice. Dec 65, 147p
Contract FA-64-WA-5183,
Proj. FAA-430-202-01E (421-030-50E)
SRDS RD-65-109

Descriptors: (*Runways, Snow removal), (*Snow removal, Lighting equipment), (*Heaters, Pavements), (*Lighting equipment, Runways), Heating elements, Melting, Performance (Engineering).

Identifiers: Heat pumps.

The heating requirements for snow melting were found to vary widely with meteorological conditions. A satisfactory method of determining heating requirements for a location is presented; this method is based on the 'ASHRAE Guide and Data Book'. For airport use, a system adequate for 98% of the snowfall hours was selected for snow removal in front of inset lights. Some minor snow accumulation may occur during severe storms, but such severe conditions would limit runway use for reasons other than snow accumulation during this time period. Electrical heaters and a simple heat pump were installed at NAFEC for evaluation. The heat pump consisted of an inverted L-shaped sealed pipe which contained liquid

ammonia, in the vertical leg. It was found that simple hairpin, or W-shaped, electrical heater patterns operated at 25 to 50 watts per lineal foot at a depth of 1 inch were satisfactory for both asphalt and concrete surfaces. The heat-pump design, as used, was not adequate for the performance desired; however, a redesign should increase its heating capacity. The cost for installing an electrical heater, the necessary supply wiring, and the transformers was estimated at about $200 each for a typical all-weather runway. (Author)

2. AGRICULTURE

REIC-37 **Field 2B**
CFSTI Prices: HC$4.00 MF$0.75
Radiation Effects Information Center, Columbus, Ohio.
THE SPACE-RADIATION ENVIRONMENT AND ITS INTERACTIONS WITH MATTER,
by E. R. Leach, B. P. Fairand andL. H. Bettenhausen. 15 Jan 64, 105p

Descriptors: (*Space environmental conditions, Radiation measurement systems), (*Radiation damage, Space environmental conditions).

3. ASTRONOMY AND ASTROPHYSICS

LADC-6429 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
STELLAR OPACITIES,
by Arthur N. Cox. 1964, 7p
Contract W-7405-eng-36

Descriptors: (*Stars, Solar radiation).

PB-169 140 **Field 3B**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Stanford Electronics Labs.
A MODEL FOR THE SOURCES OF THE SLOWLY VARYING COMPONENT OF MICROWAVE SOLAR RADIATION.
Scientific rept. no. 1,
by T. Kakinuma and G. Swarup. Mar 62, 39p
SU-SEL-62-039, SRAI-Pub-17
Grant NSF-G11572

Descriptors: (*Radio astronomy, Sun), (*Solar radiation, Radio waves), Microwaves, Extraterrestrial radio waves, Thermal radiation, Plasma physics, Solar atmosphere, Astrophysics.

A comparison of the observations of the slowly varying component of the solar radio emission made with high-resolution interferometers operating at wavelengths of 3.2, 7.5, 9.1, and 10.7 cm shows that the flux densities of many strong sources are higher at the longer wavelengths than at 3 cm. The same conclusion is derived from eclipse and statistical investigations, which indicate further that the spectrum of the flux density has a peak around 6 cm. The decrease of slux density with frequency cannot be explained simply by assuming a greater optical thikness for the extraordinary wave near 10 cm in the million-degree corona, as given by the magnetoionic theory, since the observed degree of polarization at 7.5 or 9.1 cm is much lower than that at 3.2 cm. It is suggested that radiation at the gyrofrequency and its harmonics emitted by the thermal electrons in the dense region over a sunspot group should be taken into account to explain the spectrum of the slowly varying component. This mechanism of resonance absorption requires the average strength of the magnetic field over the sunspot group to be about 600 gauss at a height of 2 x 10,000 km above the photosphere and 250 gauss at a height of 4 x 10,000 km. (Author)

4. ATMOSPHERIC SCIENCES

AD-443 485 **Field 4A, 3B**
CFSTI Price: HC$3.00
Lockheed Missiles and Space Co., Sunnyvale, Calif.
COSMIC RADIATION: AN ANNOTATED BIBLIOGRAPHY,
by Peter R. Stromer and Helen B. McCormick.
May 63, 77p Rept. nos. 3-56-63-4, SB-63-71
Contract AF04 (647)-787
N64 26822

Descriptors: (*Cosmic rays, Bibliographies), (*Space environmental conditions, Bibliographies), Atmospheric sounding, Abstracts.

This bibliography contains a comprehensive selection of reference material on the title subject with emphasis on the near Earth space environment as differentiated from interplanetary space. Period of coverage is from 1960 to early 1963. A detailed subject index has been provided. The facilities of the Lockheed Missiles and Space Co. Technical Information Center were utilized in the bibliographic compilation. The search was completed in May 1963. (Author)

AD-466 187 **Field 4B**
CFSTI Prices: HC$4.00 MF$1.00
United Aircraft Corporate Systems Center, Farmington, Conn. Weather System Center.
GENERAL APPLICATION OF METEOROLOGICAL RADAR SETS,
by R. J. Boucher and R. Wexler. 8 Apr 65, 136p
Contract AF19 (628)-3357
AWS TR-184

Descriptors: (*Meteorological radar, State-of-the-art reviews), (*Weather forecasting, Meteorological radar), Radar equipment, Specifications, Radar signals, Propagation, Atmospheric precipitation, Radar scanning.

The contents of this report reflect the state of the art, from an operational viewpoint, in detecting, processing, displaying and interpreting weather radar data. The text consists of Radar Fundamentals, Propagation, Detection and Attenuation, Function and Use of Quantitative Techniques, Comparisons and Recent Advances utilizing contemporary surveillance and cloud detecting weather radars.

AD-466 318 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
HIGH ALTITUDE WIND MEASUREMENTS BY COLLECTING AND PROCESSING METEOR RADAR ECHOES.
Scientific rept.,
by Mario D. Grossi. 13 Apr 65, 25p Scientific-1
Contract AF19 (628)-3248,
Proj. AF-6682,
Task 668207
AFCRL 65-362
Aeronomy rept. no. 1. Direct Aeronomic Measurements in the Lower Ionosphere. Informal Conference Record, p82-8 Dec 1, 1963. Prepared for presentation at Illinois Univ., Urbana 21-23 Oct 63.

Descriptors: (*Wind, Measurement), Ionization trails, Meteors, Radar tracking, Doppler effect, Radar echo areas, Atmospheric motion, Upper atmosphere.

A system study is reported of a multistatic phase-coherent VHF radar capable of collecting meteor echoes from a volume in the upper atmosphere measuring approximately 30 km by 50 km horizontally and 16 km vertically, with the vertical dimension extending from 80 to 96 km above ground level, and with 240 resolvable cells. The basic measurements provide the radial components of the true wind velocities, and are expected to be obtained at a rate of 4000 samples/hr from the doppler shift of the echoes. By processing the collected information in a high-speed digital computer, quasi-real-time 2-dimensional and 3-dimensional wind velocity determinations are expected to be calculated at a rate of 100 determinations/hr and 2 determinations/hr respectively. A system will be implemented according to these design criteria in Havana, Illinois, before end of 1965, by modifications of the existing radar system of the Harvard University Radio Meteor Project. (Author)

AD-466 804 **Field 4B**
CFSTI Prices: HC$3.00 MF$0.75
Armour Research Foundation, Chicago, Ill.
EDDY FORMATION AND DECAY ON FREE STREAM BOUNDARIES.
Final rept., 1 Jul 61-1 Aug 62,
by J. E. Ash. 31 Jul 62, 65p
Contract DA-11-22-ORD-3989,
Proj. ARF-4250

Descriptors: (*Jet streams (Meteorology), Nonlinear differential equations), Partial differential equations, Stability, Atmospheric motion, Turbulence, Reynolds number, Fourier analysis, Series, Mathematical analysis.

Equations are formulated for the growth of hydrodynamic disturbances in a jet stream. The non-linear interactions of finite amplitude disturbances are examined, using the Navier-Stokes equations. The jet stream is represented as a parallel shear flow, and the possible existence of a dominant disturbance mode is considered. A set of ordinary linear differential equations are developed to provide a method for the computation of the spatial growth of finite three-dimensional disturbances describing the characteristics of such possible dominant modes which might be pertinent to the stability, control, and structural response of missiles encountering atmospheric disturbances in jet streams. (Author)

C13.46-315 **Field 4A**
CFSTI Price: MF$0.50
Central Radio Propagation Lab., Boulder, Colo.
A METHOD FOR OBTAINING THE PARAMETERS OF ELECTRON-DENSITY PROFILES FROM TOPSIDE IONOGRAMS.
Technical note,
by Robert S. Lawrence and Margot Hallenbeck. 3 Aug 65, 35p TN-315
Availability: Hardcopy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.25.

Descriptors: (*Electron density, Atmospheric sounding), (*Atmospheric sounding, Electron density), Atmosphere models, Mathematical models, Programming (Computers).

Sample results of a model-fitting procedure are presented which involves adjustment of physically meaningful parameters of a model ionosphere so as to minimize the mean square difference between the observed virtual depths and those calculated for the model. The adjustment is made subject to additional constraints such as (1) physically reasonable limits to the values of the parameters and (2) agreement with any available auxiliary information such as the electron density at the satellite. The method requires more computer time than do conventional methods but compensates by making extremely economical use of observational data. It has been demonstrated that the method will provide useful information from data which are too scanty to be usable by lamination or polynomial methods. When, as ocasionally happens, the process fails to find a useful answer, the reason appears to be that the ionosphere cannot be represented by the model being used. On the other hand, the use of physical limits on the parameters seems to insure that erroneous or multiple solutions will not occur. (Author)

LA-DC-6495 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
North Carolina State Univ., Raleigh.
NEGATIVE SCALE HEIGHT IN IONIZED UPPER ATMOSPHERE ABOVE 4200 KILOMETERS ALTITUDE,
by David N. Anderson, Willard H. Bennett, and Leslie C. Hale. 1962, 5p
Contract W-7405-eng-36
Prepared in Cooperation with Los Alamos Scientific Lab., N. Mex.

Descriptors: (*Upper atmosphere, Electron density).

MIT-2241-3 Field 4A
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Dept. of Meteorology.
A REVIEW OF STUDIES OF EDDY FLUXES IN THE STRATOSPHERE AND MESOSPHERE.
Rept. no. 12,
by Reginald E. Newell. 14 Jan 65, 71p CONF-650309-1
Contract AT (30-1)2241
Presented at Meteorological problems in the stratosphere and mesosphere, Paris.

Descriptors: (*Atmospheric motion, Upper atmosphere), (*Upper atmosphere, Atmospheric motion).

MIT-2241-4 Field 4A
CFSTI Prices: HC$5.00 MF$1.00
Massachusetts Inst. of Tech., Cambridge. Dept. of Meteorology.
A MODELING STUDY OF THE MERIDIONAL TEMPERATURE PROFILE AND ENERGY TRANSFORMATIONS IN THE LOWER STRATOSPHERE,
by Li Pang. 7 Apr 65, 169p Rept. no. 13
Contract AT (30-1)-2241

Descriptors: (*Stratosphere, Thermal properties).

PB-169 132 Field 4B
CFSTI Prices: HC$2.00 MF$0.50
Chicago Univ., Ill. Cloud Physics Lab.
PROJECT WHITETOP, APRIL 4, 1964 TO APRIL 3, 1965.
Final rept.,
by Roscoe R. Braham, Jr. 25 Oct 65, 30p
Grant NSF-G-22419

Descriptors: (*Artificial precipitation, State-of-the-art reviews), (*Meteorology, Artificial precipitation), Clouds, Nucleation, Urea, Rainfall, Scientific research, Bibliographies.

Identifiers: Whitetop project.

The report covers the third and final year of a three year grant and the fifth and final year of a five year randomized cloud seeding experiment with associated studies of basic cloud and rain physics. The report begins with a short summary of the 1964 operational season and compares it with the four previous seasons. A summary of data analysis is given. A preliminary report on the analysis of the seeding experiments is presented. A report of tests and experiments run with Urea as a new seeding agent is discussed. A list of reports and publications which have come from this project to date is also included.

PB-169 181 Field 4B
CFSTI Prices: HC$1.00 MF$0.50
Weather Bureau, Washington, D. C.
A RECORD SNOWFALL FOLLOWED BY A RECORD LOW TEMPERATURE AT MEMPHIS, TENNESSEE, DECEMBER 22-24, 1963.
Southern Regional note no. 2,
by Cecil M. Palmer. Dec 65, 16p WB-TN-24-SR-2

Descriptors: (*Weather forecasting, Snow), (*Snow, Weather forecasting), (*Climatology, Tennessee), Meteorological parameters, Air mass analysis.

A study is made of synoptic conditions which developed into a snowy, cold wave, producing a band of heavy snow through the Mid-South and subsequently record cold temperatures. Conditions most likely to evolve into this type of activity are reviewed and the 1963 situation is compared with previous heavy snows in the Memphis area. A brief comparison is made with previous heavy models and conclusions concerning forecasting heavy snows in the Memphis are are presented. (Author)

PB-169 182 Field 4B
CFSTI Prices: HC$1.00 MF$0.50
Weather Bureau, Washington, D. C.
FORECASTING PRECIPITATION AND AREAL PRECIPITATION COVERAGE FROM AIR-MASS THUNDERSTORMS IN NORTH-CENTRAL ALABAMA.
Southern Region note no. 1,
by Baker B. Williams. Nov 65, 16p WB-TN-21-SR-1

Descriptors: (*Weather forecasting, Thunderstorms), (*Thunderstorms, Weather forecasting), Atmospheric precipitation, Meteorological parameters, Air mass analysis, Alabama.

An objective method for forecasting precipitation from convective, air-mass thunderstorms in north-central Alabama is presented. The predictors are easily obtained and the predictand is in a form which indicates the percent of the area which will receive precipitation from the thunderstorms. Results from applying the forecast method under operational conditions, July 1, 1960 through September 30, 1964, are evaluated. The forecasts are very accurate in predicting precipitation from afternoon and evening thunderstorms within a 20-mi. radius of Huntsville, Ala. and assisted the forecaster in determining the percent of the area which would receive rain from the thunderstorms. (Author)

5. BEHAVIORAL AND SOCIAL SCIENCES

AD-445 869 Field 5I
CFSTI Price: HC$2.00
Applied Science Associates, Inc., Valencia, Pa.
DEVELOPMENT OF AN IMPROVED METHOD OF TASK ANALYSIS AND BEGINNINGS OF A THEORY OF TRAINING.
Technical rept.,
by John D. Folley, Jr. 22 Jun 64, 44p
Contract N61339-1218
NAVTRADEVCEN 1218-1
See also AD-445 870.

Descriptors: (*Job analysis, Theory), (*Training, Job analysis), Performance (Human), Probability, Decision making, Specifications.

The problem was to devise an effective method of task analysis that would fit in with a larger program of training device development. Four major results were obtained: (1) A set of Guidelines for Task Analysis. These Guidelines include: (a) Background material thought to be useful to the task analyst (e.g. 'The Nature of Task Analysis' and 'The Nature of the Task Analyst') (b) An overview of the process of task analysis. (c) Samples of forms to be used in task analysis. (d) Instructions on what information to obtain, how to get it, and where and how to record it. (e) Examples of completed portions of a task analysis. (2) A system of interrelated definitions, constructs, and hypotheses relating task attributes to training requirements. (3) Recommendations for further research to improve Task Analysis and Training Situation Analysis.

AD-445 870 Field 5I
CFSTI Price: HC$2.00
Applied Science Associates, Inc., Valencia, Pa.
GUIDELINES FOR TASK ANALYSIS.
Technical rept.,
by John D. Folley, Jr. 22 Jun 64, 40p
Contract N61339-1218
NAVTRADEVCEN 1218-2
See also AD-445-869.

Descriptors: (*Job analysis, Theory), (*Training, Job analysis), Decision making, Determination, Time studies.

The guidelines are to help the TSA team in accomplishing the task analysis part of the Training Situation Analysis (TSA) specified in the basic instructions for TSA, and supplemented in the memorandum 'TSA Guidelines' dated 6 April 1962. The first section of the Guidelines presents some basic ideas that the analyst should understand before getting into the instructions for task analysis. The following sections present the stages of the task analysis method essentially in the order in which they would normally be performed. Examples are given to illustrate the type of data required, and discussions of special problems or techniques are included where they clarify the instructions. (Author)

AD-467 547 Field 5D, 5K
CFSTI Prices: HC$6.00 MF$1.50
Georgetown Univ., Washington, D. C. Inst. of World Polity.
THE LAW OF LIMITED INTERNATIONAL CONFLICT.
Apr 65, 282p
Contract SD-179

Descriptors: (*Political science, Limited war), War potential, Warfare, United Nations, United States Government, Guerrilla warfare, Theory, Foreign policy, Government (Foreign), Bibliographies, Deterrence, Guerrilla warfare.

The purpose of the study is two-fold: (A) to analyze the international legal norms and institutions presently governing international conflict short of conventional war and to project estimates of the foreseeable evolution of these norms and institutions; (B) to recommend policy positions for the United States with respect to the interpretation, application, sanctioning, and further development of the low of limited international conflict so as to secure: (1) a minimum international legal order for a world divided into profoundly different, competing systems which seek to extend themselves beyond their territorial bounds; (2) the survival of the basic values guaranteed by the United Nations Charter and the United States consitutional system, particularly the rights of individuals and societies to choose their way of life freely. (Author)

AD-467 958 Field 5I, 5J
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
ATTRITION DATA AS A CRITERION. III. MEDICAL ATTRITIONS WITH ANXIETY SYMPTOMS.
Research rept.,
by John T. Bair and Rosalie K. Ambler. 15 Mar 55, 4p
NM 001-109-100-08

Descriptors: (*Attrition, Anxiety), (*Anxiety, Attrition), Aviation personnel, Students, Medical examination, Naval personnel.

The report is designed (1) to identify a group of medical attritions with manifest anxiety attitudes, (2) to compare the anxiety group with non-anxiety medical attritions and with successful cadets, (3) to evaluate this anxiety group of attritions as another more refined criterion. Interview records were analyzed of 63 cadets dropped from the Naval Air Basic Training Program for medical reasons. These records were then evaluated to determine which of those interviewed did or did not reveal anxiety symptoms. The characteristics of the anxiety group of medical attritions were explored further by comparing their Flight Aptitude Ratings, Pre-Flight academic grades, and age to these same measures on a group of successful cadets. In general, the findings of this research indicate that the anxiety medical attrition group is a substandard group in many respects. Although it cannot be demonstrated statistically for these data, there may be an ordered relationship for these three groups. That is, the non-anxiety medical attritions may belong between the successful and anxiety group on a continuum of aptitude, academic proficiency, and attitude toward flying.

AD-467 960 Field 5J
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.

A RAPID METHOD FOR SCORING THE GLADSTONE GROUP PALMAR SWEAT TEST.
Research rept.,
by Robert B. Voas. 15 Mar 55, 4p NSAM-244
NM 001-108-108-02

Descriptors: (*Test construction (Psychology), Reliability), (*Perspiration, Measurement), Psychometrics, Correlation techniques, Optical analysis, Intensity.

Recently, two methods of measuring palmar sweat which can be used with large groups have been described. The simplest of these is that of Gladstone which is an adaptation of a test developed by Silverman and Powell. The method as described by Gladstone consists of preparing paper in a five percent tannic acid solution and then coating the subject's fingers with a solution of ferric chloride and acetone. After the fingers dry, they are pressed against the paper for a period of three minutes. This produces a print the darkness of which is a function of the amount of sweat present on the fingers. The present paper deals with the method of scoring these prints. Gladstone scored the prints by passing a light through them and activating a photoelectric cell, the output from which was measured with a microammeter. The score thus obtained is inversely proportional to the darkness of the print. The reliability of this method was found to be .993 for 41 cases.

AD-467 963 **Field 5J, 6E**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
AUTHORITARIANISM AND DENTAL CARIES.
Research rept.,
by John H. Manhold. 15 Mar 55, 6p NSAM-247
NM 001-108-109-03

Descriptors: (*Leaderhsip, Physical fitness), (*Teeth, Diseases), (*Physical fitness, Leadership), Psychophysiology, Correlation techniques.

Nonauthoritarians have been found to maintain under normal circumstances a lower level of physical fitness relative to their capacities than do authoritarians. The interpretation placed upon this finding is that background, aptitudes, and interests all conspire to bring about a deemphasis of physical activities among nonauthoritarians and an emphasis upon them among authoritarians. In part, this interpretation supposes that the nonauthoritarian, intent upon more sedentary pursuits, tends to neglect his physical condition. A person who neglects his body in general may also neglect his mouth in particular. Ifso, dental decay among nonauthoritarians might well progress further than among authoritarians. To determine whether or not there is any relationship between dental decay and authoritarianism is the purpose of the study. It was concluded that nonauthoritarians have higher DMFs than have more authoritarian persons.

AD-467 973 **Field 5I, 5J**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
A CANONICAL ANALYSIS OF NAVAL AVIATION CADET CRITERION GROUP DIFFERENCES.
Research rept.,
by Robert F. Lockman. 15 Mar 55, 5p NSAM-206
NM 001-108-100-08

Descriptors: (*Naval personnel, Attrition), (*Psychometrics, Aviation personnel), Students, Naval training, Analysis of variance.

Previous research on selected groups of naval aviation cadets indicated that the Mechanical Comprehension Test (MCT), Flight Aptitude Rating (FAR), and age selection measures together significantly discriminated and predicted successful and attrition groups at the end of primary naval air training. This study determines what predictor components or factors accounted for the significant distance or variation between the above criterion groups and describes these groups with respect to the minimum number of standardized dimensions of variation.

AD-467 977 **Field 5J, 6E**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
AUTHORITARIANISM AND PHYSICAL FITNESS.
Research rept.,
by Marshall B. Jones and John H. Manhold. 15 Mar 55, 7p
NM 001-108-109-02

Descriptors: (*Leadership, Physical fitness), (*Physical fitness, Leadership), Psychophysiology, Correlation techniques.

To the extent that an individual surrenders his personal autonomy to the dictates of an external agency he is authoritarian. The biographies, aptitudes, and interests of authoritarians differ widely from those of nonauthoritarians. More particularly, the authoritarian is poorer, less able scholastically, and less interested in scholastic affairs than is the nonauthoritarian. In consequence, the authoritarian may well be, by necessity, by compensation, or by choice more active physically than his less authoritarian fellow. Indeed, results from this laboratory with the Guilford-Zimmerman Temperament Survey and with the Thurstone Temperament Schedule would indicate that this is the case. Conceivably, this difference in physical activity could affect physical fitness itself. If so, the physical condition of nonauthoritarians should, under normal circumstances, be worse, relative to their capacities, than the physical condition of authoritarians. The present study is concerned with an empirical examination of this possibility.

AD-467 982 **Field 5J, 5I**
CFSTI Prices: HC$2.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE PREDICTION OF ANXIETY IN AVIATION STUDENTS.
Research rept.,
by Joseph de Rivera. 15 Mar 57, 27p
NM 16-01-11-11-1

Descriptors: (*Aviation personnel, Anxiety), (*Anxiety, Students), Psychometrics, Instructors, Correlation techniques.

A description of the anxiety experienced by 59 student aviators is presented. Five factors which influence this anxiety were established. These factors are: (1) the students tendency to get anxious; (2) time before or between hops; (3) how good the student's last hop was; (4) personal factors such as amount of sleep; (5) the patience of the student's instructor. An attempt was made to measure some of these factors. It was found that two of the factors, tendency to anxiety and instructor patience, are measurable. When the tests which measured these factors were combined, a multiple correlation of .90 was obtained between the tests and an anxiety criterion. The fact that instructor patience is the variable which could best be manipulated was pointed out. A way is suggested to minimize student anxiety and increase quality of flying. This suggestion involves matching students who have a tendency toward anxiety with instructors who are patient. (Author)

AD-468 193 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
A NOTE ON THE EFFECT OF TEST SET ON THE ROSENZWEIG PICTURE-FRUSTRATION TEST.
Research rept.,
by Edward J. Wallon and Wilse B. Webb. 1 Nov 56, 5p
NM 001-108-100-19

Descriptors: (*Psychometrics, Projective techniques), (*Personality, Test construction (Psychology)), Decision making, Reaction (Psychology), Analysis of variance.

The paper reports a test of the amenability of one of the more common projective tests, the Picture-Frustration Test, to a 'set' to give a particular type of response. The results indicate that the Rosenzweig test is quite amenable to set of the subject taking the test. In four of the six scales significant differences in mean responses were obtained between the two groups. It is clear, then, that for this projective test at least the fact that it is a projection technique does not eliminate the possibility of subjects biasing their results in favorable directions.

AD-624 560 **Field 5B**
CFSTI Prices: HC$3.50 MF$2.75
Federal Council for Science and Technology, Washington, D. C. Committee on Scientific and Technical Information.
RECOMMENDATIONS FOR NATIONAL DOCUMENT HANDLING SYSTEMS IN SCIENCE AND TECHNOLOGY. APPENDIX A, A BACKGROUND STUDY, VOLS. I AND II.
Nov 65, 608p
PB 168 267

Descriptors: (*Documentation, United States Government), (*Technical information centers, United States Government), Documentation, Systems engineering, Management engineering, Scientific research.

TASK GROUP RECOMMENDATIONS: The task group of the Committee was to advise on the design of a national information transfer system, or network of systems, to serve the needs of practicing scientists and engineers and their managers so as to promote the more effective and efficient execution of the national research and development program. A set of principles and requirements for a national system are presented. Recommendations are made with a listing of four continuing tasks of high priority. The task group was assisted in its study by the Systems Development Corp. APPENDIX A, VOL. I. The Systems Development Corp. prefers the establishment of a 'Capping Agency' and the implementation of the 'Responsible Agent' concept Alternatives include a new federal and independent operating agency, a government-chartered corporation, a national library administration, and a strengthening of the present position. APPENDIX A, VOL. II: Analyses, reviews, and other supporting material used by the System Development Corp.

PB-168 690 **Field 5F**
CFSTI Prices: HC$1.00 MF$0.50
Technische Hochschule, Aachen (West Germany). Institut fuer Phyzik.
MATHEMATICAL ANALYSIS OF FORMAL STRUCTURE OF MUSIC,
by Wilhelm Fucks. 1962, 3p
Pub. in IRE Transactions on Information Theory vIT-8 n5 p225-8 Sep 1962.

Descriptors: (*Music, Pitch discrimination), (*Pitch discrimination, Music), Mathematical analysis, Information theory, West Germany.

Statistical properties of music and their development since about 1500 are studied; e.g. the properties of frequency distributions of pitch and duration of tones, of intervals of consecutive tones, correlograms of various parameters up to distances of 30 of these parameters, matrices of transition probabilities of various parameters. In the period considered, the variance of the frequency distributions of pitch grows from 3 to 13 and the mean value of the kurtosis of the intervals of consecutive tones grows from 5 to 15 and splits up in recent times into two distinct values (15 and 6,5). (Author)

PB-169 007 **Field 5A, 1C**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
RELIABILITY OF PROGRESS CURVES IN AIRFRAME PRODUCTION,
by Armen Alchian. 3 Feb 50, 36p RM-260-1
Proj. RAND
ATI 210 621

Descriptors: (*Airframes, Industrial production), (*Management engineering, Aircraft industry), Labor, Mathematical prediction, Learning curve, Reliability, Costs, Statistical tests, Statistical analysis.

The airframe manufacturing progress curve estimates direct labor per pound of airframe needed to manufacture the Nth airframe, from N, the cumulative number of planes of a given model produced at a given facility. The relation is customarily written as a linear function between the logarithm of direct labor per pound and the logarithm of the Nth airframe. Statistical tests of the similarity of the functions among various airframe manufacturers, on the basis of reported World War II data, were made in this paper. An assessment was also made of the reliability of predictions made with these curves. The functions are shown to differ among the various airframe types and manufacturing facilities both in the amount and rate of change of required direct labor per pound of airframe.

PB-169 122 **Field 5A, 5D**
CFSTI Prices: HC$3.00 MF$0.50
Office of Science and Technology, Washington, D. C.
THE ROLE OF THE FEDERAL COUNCIL FOR SCIENCE AND TECHNOLOGY.
Rept. for 1963-1964.
1965, 57p

Descriptors: (*Scientific research, United States Government), Management planning, Documentation, Oceanology, Atmosphere, Materials, Nuclear physics, Water, Behavior, Transportation, Patents.

Identifiers: Technology, Scientific information.

Part I of the report is a self-contained review of the role of the Federal Council and its operations, including the work of groups set up by the Council. Parts II and III provide full details on the work of the committees and panels of the Council. (Author)

PB-169 168 **Field 5B**
CFSTI Prices: HC$1.00 MF$0.50
Stanford Univ., Calif.
INFORMATION RETRIEVAL AS A RECEIVER-CONTROLLED COMMUNICATION SYSTEM,
by William J. Paisley and Edwin B. Parker. 1965, 10p
Grant NSF-GN-434
NSF Scientific Documentation Project. Proceedings of the Symposium on Education for Information Science, Warrenton, Virginia, September 7-10, 1965, p23-31 1965.

Descriptors: (*Information retrieval, Information theory), Education, Communication systems, Subject indexing, Psychology, Behavior.

Identifiers: Information sciences.

Information storage and retrieval systems are characterized as receiver-controlled systems for the communication of information through space and time. The conclusion is reached that in designing, evaluating, or operating an information retrieval system, considerable attention must be paid to the information needs and search strategies of the system user. A program of behavioral science research concerned with such problems should be an important part of any large program of 'information sciences' research. Education for 'information science' should include relevant behavioral-science courses, including psychology, and research methodology.

PB-169 176 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Civil Aeromedical Research Inst., Oklahoma City, Okla.
ATC SYSTEM ERROR AND APPRAISAL OF CONTROLLER PROFICIENCY,
by William F. O'Connor and Richard G. Pearson.
Jul 65, 13p
AM 65-10

Descriptors: (*Air traffic controllers, Performance (Human)), (*Personnel management, Air traffic controllers), Air traffic control systems, Human engineering, Man-machine systems, Systems engineering, Errors, Behavior.

The report presents suggestions for the design of an air traffic control (ATC) incident-reporting system aimed at maximizing the amount of corrective feedback to the ATC system. The approach taken is system-oriented rather than controller-oriented. Included is a discussion of a philosophy of corrective and punitive action relative to controller involvement in an incident. Recommenda-tions and examples of format are included for the design of incident-report forms and incident chronology and of a checklist to be used in periodic appraisal of controller performance. Emphasis is given in format design to use of systems and human function, rather than regularoty and procedural terminology. Implementation and data-analysis technique are also discussed. (Author)

RL-SA-37 **Field 5E, 18I**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation. Richland, Wash.
INDUSTRIAL NOISE CONTROL IS PRACTICAL,
by P. H. Hutton. 21 May 65, 12p CONF-650808-1
Contract AT (45-1)-1350
Prepared for presentation to American Industrial Hygiene Assn., Seattle.

Descriptors: (*Noise, Control), (*Nuclear reactors, Noise).

SC-R-65-923 **Field 5I, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
A GENERIC CLASSIFICATION FOR TEACHING MACHINES,
by G. J. Simmons. Jun 65, 15p CONF-650548-1
Contract AT (29-1)-789
Presented at National Society for Programmed Instruction, Annual convention (3rd), Philadelphia.

Descriptors: (*Teaching machines, Programming (Computers)).

6. BIOLOGICAL AND MEDICAL SCIENCES

AD-466 788 **Field 6F, 5K**
CFSTI Prices: HC$3.00 MF$0.75
Pennsylvania State Univ., University Park. Dept. of Sociology and Anthropology.
A PRELIMINARY STUDY OF THE CULTURAL AND BIOLOGICAL CHARACTERISTICS OF A PERUVIAN HIGHLAND POPULATION.
Annual progress rept.,
by Paul T. Baker. 1 Jul 65, 67p
Contract DA-49-193-MD-2260

Descriptors: (*Anthropology, Peru), (*Peru, Anthropology), Culture, Biology, Nutrition, High altitude, Geography, Ecology, Population, Climatology, Economy, Social communication, Infants, Survival.

In the first part of the report the general geography, climate and culture of the District of Nunoa in Peru is presented. The suitability of Nunoa as a site for the study of bio-cultural adaptation to altitude and its associated stresses is evaluated. The Nunoa district is one of the highest areas of the world which has been occupied by man over several hundred generations. Despite some acculturative influence in recent years the majority of the population still lives in a traditional pastoral economy supplemented with some agriculture so as to maintain a stable ecosystem. The method of collecting data on the biological characteristics of the population is briefly presented. A preliminary analysis of the physical growth of the children is included. The analysis demonstrates that the Nunoa population is one of the latest maturing peoples in the world and by comparing the growth pattern and nutrition of this group with a lower elevation Indian group it is shown that their late maturation status may be the direct result of altitude stress. A study of neonatal mortality in relation to altitude in Peru is included as an appendix.

AD-467 170 **Field 6A, 6M, 6P**
CFSTI Prices: HC$1.00 MF$0.50
Wistar Inst. of Anatomy and Biology, Philadelphia, Pa.
INFLUENCE OF DEUTERIUM OXIDE ON BIOLOGICAL SYSTEMS. A. VIRUS GROWTH IN TISSUE CULTURE CELLS. B. OXIDATION OF CHOLESTEROL BY RAT LIVER MITOCHONDRIA.
Progress rept. no. 1, Jun 64-May 65,
by David Kritchevsky. 1 Jul 65, 19p
Contract DA-49-193-MD-2589,
Proj. DA-1C622401A096,
Task 1C622401A096-03

Descriptors: (*Heavy water, Metabolism), (*Viruses, Growth), (*Cholesterol, Oxidation), (*Culture media, Heavy water), Tissue culture, Ribonucleic acids, Western equine encephalomyelitis virus, Rubella, Rabies virus, Biological assay, Fluorescent antibody techniques, Enzymes, Octanoic acids, Mitochondria, Labelled substances, Reproduction (Physiology).

The purpose of the research was to investigate the effects of deuterium oxide (D2O) upon virus growth in tissue culture cell systems. The work carried out was aimed at examining the possibility that the enhancement of virus growth observed with poliomyelitis virus was characteristic of all RNA containing viruses. Three RNA viruses, of varying size, were studied. The first was Western Equine Encephalitis which was propogated in chick embryo fibroblasts grown in Petri dishes. A second series of experiments were carried out with Rubella virus which was grown in monolayer cultures of monkey or rabbit kidney. In a third series of experiments, the effect of D2O upon the growth of several strains of rabies virus in a variety of tissue culture cell systems was studied. The presence of D2O (25 or 40%) in the medium did not affect virus replication in any case. The effects of D2O upon the oxidation of cholesterol-26-C14 and octanoate-1-C14 to C14O2 were investigated by mitochondrial preparations from male and female rat livers. With mitochondrial preparations made in D2O (pH 8.5 or 8.1) the oxidation of both substrates was markedly reduced. Part of the effect on cholesterol oxidation is attributed to inhibition of the rate of nuclear changes which precede side-chain oxidation.

AD-467 682 **Field 6E, 6R**
CFSTI Prices: HC$1.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
FETAL LIVER AND THYMUS: ROLES IN THE ONTOGENESIS OF THE MOUSE IMMUNE SYSTEM,
by Marvin L. Tyan and Leonard J. Cole. 21 Jun 65, 12p USNRDL-TR-870
NAVMED MR005.08-1200-2

Descriptors: (*Immunology, Transplantation), (*Transplantation, Immunology), Cells (Biology), Liver, Thymus, Embryos, Radiation effects, Excision, Antigens + antibodies, Immunity, Physiology, Mice.

Liver cells or thymic grafts from homozygous embryonic mice were subjected to passage through appropriate nonoperated or thymectomized adult F1 hybrids. Passage through a nonthymectomized host was required for masturation of potential immunologically competent cells derived from embryonic liver; this was not true with regard to cells derived from a fetal thymic graft. Cells from embryonic liver were found first in the host thymus while those from thymic grafts appeared to migrate exclusively to peripheral lymphoid tissues.

AD-467 969 Field 6S
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE EFFECTS OF ANGULAR ACCELERATION AND CENTRIFUGAL FORCE ON NON-VISUAL SPACE ORIENTATION DURING FLIGHT. II. INFLUENCE OF HABITUATION AND TECHNIQUE OF ASSUMING THE TURN,
by K. MacCorquodale, Ashton Graybiel and Louis Iverson. 22 Jul 46, 13p Research rept. RR-15, NSAM-416
Proj. X-148 (Av-4-3)

Descriptors: (*Positioning reactions, Flight crews), (*Instrument flight, Positioning reactions), Posture, Sensation (Physiology), Psychophysiology, Acceleration, Torque, Angle of attack, Flight testing, Space perception, Adaptation (Physiology), Aviation medicine.

The results of this study indicate that change in the angle of attack of the aircraft is not necessary to produce feelings of backward tilting during a turn, or subsequent feelings of forward tilt upon recovery from a turn. This analysis does not preclude the possibility that, actually, in spite of differences in method of controlling the aircraft, the g stimuli were essentially the same in both instances. This possibility will be investigated when adequate measuring devices are installed in the aircraft. These results also indicate that the total perception of spatial orientation, as reflected by the reports of these observers, may be reported with considerable reliability, and suggest that the component sensations themselves are not unpredictable or capricious in their appearance. Some evidence is found for learning to report the phenomena, as reflected by generally shorter lags in the second series. Evidence for habituation is reflected by a slight reduction in frequency and magnitude of the perceptions. Similar results have been observed in the visual effects of angular acceleration and g force in flight.

AD-467 975 Field 6S
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE OCULO-GYRAL ILLUSION: A FORM OF APPARENT MOTION WHICH MAY BE OBSERVED FOLLOWING STIMULATION OF THE SEMICIRCULAR CANALS,
by Ashton Graybiel and Dorothy Hupp. 1 Nov 45, 23p Research rept. RR-4, NSAM-405
Proj. X-148 (Avv4-3)

Descriptors: (*Nystagmus, Illusions), (*Semicircular canals, Nystagmus), Afterimages, Rotation, Stimulation, Vestibular apparatus, Sensation (Physiology), Posture, Visual perception, Vertigo, Adaptation (Physiology), Aviation medicine, Night flight.

Conclusions: Rotatory acceleration may give rise to a visual illusion of movement which we have termed the oculo-gyral illusion. It is the result of nystagmus produced reflexly by stimulation of the sensory receptors in semicircular canals. In the light, and especially if visual cues are plentiful, relatively strong stimulation is required to produce even weak illusory effects. If an object is viewed in darkness, relatively weak stimulation will produce strong illusory effects. The threshold for stimulation in the case of the horizontal canals is in the neighborhood of 0.3 degrees per second per second. When the fixation object consists of a single light the oculogyral illusion is complicated by the phenomenon of autokinesis. The latter is largely abolished by using a three-dimensional target. The direction of the apparent movements of induced afterimages both during and following rotation is exactly opposite to that observed when a real target is fixated. The relationship between head position or change in head position and the direction of apparent movement indicates the relatively simple reflex character of the phenomenon. Hyoscine hydrobromide in doses as large as 3/200 of a grain had no appreciable effect on the oculogyral illusion. The oculo-gyral illusion offers a simple means of studying the sensitivity of the sensory receptors of the semicircular canals, the reflexly produced nystagmus and related phenomena. (Author)

AD-467 985 Field 6E
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
INCIDENCE OF HEART DISEASE IN SCHOOL CHILDREN OF PENSACOLA, FLORIDA.
Research rept.,
by John M. Packard, John S. Graettinger and Ashton Graybiel. 25 Oct 51, 21p
NM 001-057-02.01

Descriptors: (*Cardiovascular diseases, Children), Medical examination, Electrocardiography, X rays, Heart, Pathology, Rheumatic diseases, Diagnosis, Florida.

The material, methods, and criteria used in conducting a cardiovascular survey of the white school children in Pensacola, Florida, are presented. Twenty-six hundred children were examined, ranging in age from 9 to 23 years, and representing 58.5% of all the students enrolled in grades four through twelve. Twenty-two cases of organic heart disease were encountered, an incidence of 0.85%. Ten cases were of rheumatic origin (0.38%), ten were of congenital origin (0.38%), and two were of undetermined etiology (0.08%). Included in the ten cases of congenital heart disease are four cases of the WolffParkinson-White syndrome. The incidence of rheumatic heart disease is comparable with that found in other surveys conducted in the southern part of the United States, and is much lower than the rates reported from northern areas. (Author)

AD-468 152 Field 6S
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE ILLUSORY PERCEPTION OF MOVEMENT CAUSED BY ANGULAR ACCELERATION AND BY CENTRIFUGAL FORCE DURING FLIGHT. II. VISUALLY PERCEIVED MOVEMENT OF A FIXED TARGET DURING TURNS,
by Brant Clark, Ahston Graybiel and K. MacCorquodale. 16 May 46, 17p Research rept RR-8
Proj. X-148 (Av-4-3)

Descriptors: (*Visual perception, Night flight), Tracking, Illusions, Acceleration, Space perception, Targets, Recovery, Time studies, Positioning reactions, Vestibular apparatus, Aviation medicine.

The oculo-gyral and oculo-gravic illusions were studied in flight using three trained subjects who observed a fixed luminous target in the dark. All observations were made in the rear cockpit of a standard Navy training plane. The subject gave a running account of the apparent motion and displacement of the target while the pilot maneuvered the plane through different degrees of bank. All of the observers' reports and the pilot's signals were recorded on an airborne wire recorder and written transcriptions of these recordings were made in the laboratory. These written protocols served as a basis for the analyses of the data. The results show that illusions of motion and displacement may occur during all degrees of bank for 10 to 60 degrees, and always occurred during banks of 40 degrees and above. There is a direct relation between the degree of bank and the amount of motion and displacement observed; the maximum observed displacement of the star from the 'true' position was 50 degrees. All displacements were observed in or close to the vertical plane whereas motion was observed not only upward and downward but to the right and left.

AD-468 188 Field 6S
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE ILLUSORY PERCEPTION OF MOVEMENT CAUSED BY ANGULAR ACCELERATION AND BY CENTRIFUGAL FORCE DURING FLIGHT. IV. ILLUSORY ROTATION OF A TARGET DURING TURNS,
by Brant Clark, Ashton Graybiel and Kenneth MacCorquodale. 4 Sep 46, 14p Research rept. RR-16
Proj. X-148 (Av-4-3)

Descriptors: (*Visual perception, Night flight), Illusions, Tracking, Flight simulators, Rotation, Acceleration, Space perception, Motor reactions, Positioning reactions, Attention, Stress (Psychology), Statistical data, Aviation medicine.

The study was designed to collect additional data on illusory motion and displacement of a fixed target in the dark while the plane in which the observations were made executed turns at varying degrees of bank. Four subjects made observations in the rear cockpit of an SNJ-6 aircraft during flight. They followed a previously established procedure save in one regard. Instead of attempting to report all of the illusory motion present they confined their attention to a single aspect namely, the apparent rotation of a collimated star about its central point. The verbal reports were inscribed on an airborne wire recorder and analyzed in the laboratory. Observations were also made in a specially modified Link Trainer in the laboratory to attempt to clarify the stimulus response relationships. Illusory rotation including both motion and displacement of the target occurred at all degrees of bank from 10 to 60 degrees. This was true both on entering a bank and during recovery to straight and level flight. The illusory rotation was in the direction of the banking motion of the plane and the motion and displacement waned a few seconds after the plane had assumed the new attitude.

AD-468 189 Field 6S
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
APPARENT ROTATION OF A FIXED TARGET ASSOCIATED WITH LINEAR ACCELERATION IN FLIGHT,
by Ashton Graybiel, Wilbur E. Kellum and Louis Iverson. 27 Sep 47, 14p Research rept. RR-19, NSAM-420
Proj. X-148 (Av-4-3)

Descriptors: (*Illusions, Night flight), Space perception, Motion, Positioning reactions, Targets, Rotation, Visual perception, Acceleration, Deceleration, Vertigo, Aviation medicine.

The purpose of this study was to determine the effects of linear acceleration and deceleration on the visual perception of a target in the dark. Three subjects observed a collimated 'star' in the dark while the pilot of an SNJ-6 aircraft executed various degrees of linear acceleration. The subjects gave a running account of the behavior of the 'star' using a throat microphone connected to a wire recorder. The forces produced represented the range of accelerations and decelerations occurring in the normal operation of the aircraft. The forces were measured by a three component accelerometer which showed that accelerative and decelerative forces built up to a maximum in approximately 5.5 seconds and within 2-3 seconds began to drop off slowly to zero. The net result of these accelerations and decelerations was to change both the magnitude and the direction of the resultant force acting on the subject. The magnitude of the maximum resultant forces varied between 1.004 G and 1.0925 G, and its change in direction varied between 1.7 and 23.7 degrees. When the subjects faced to the left in the aircraft the radiating lines of the star appeared to rotate about the central point to a new position. This rotation was clockwise during deceleration and counter clockwise during acceleration. As the force became smaller, the star appeared to rotate back to its normal position. This illusory rotation occurred at all stimulus levels. The thresholds of linear deceleration for motion and displacement were 0.067 G and 0.078 G respectively. All of the linear accelerations used were above threshold.

BNL-8787 **Field 6R**
CFSTI Prices: HC$2.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
RADIATION AND FIRE EFFECTS ON GAYLUSSACIA BACCATA AND VACCINIUM VACILLANS.
Master's thesis,
by Robert Duncan Brayton. Jan 65, 37p
Contract AT-30-2-GEN-16
Submitted to Rutgers, The State Univ.

Descriptors: (*Plants (Botany), Radiation effects), (*Radiation effects, Plants (Botany)).

BNL-8819 **Field 6E**
CFSTI Prices: HC$2.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
FLOW PATTERNS AND RATES OF HUMAN ERYTHROPOIESIS AND GRANULOCYTOPOIESIS,
by E. P. Cronkite, T. M. Fliedner, P. Stryokmans, and J. Ramos. 1964, 35p CONF-640805-1
Contract AT (30-2)-GEN-16
Presented at International Society of Hematology Congress, Stockholm.

Descriptors: (*Hematology, Humans).

BNL-915 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
1963 ENVIRONMENTAL RADIATION LEVELS AT BROOKHAVEN NATIONAL LABORATORY,
by A. P. Hull. Nov 64, 19p
Contract AT (30-2)-GEN-16

Descriptors: (*Radiobiology, Environment).

BNWL-144 **Field 6R, 18D**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
DETECTION OF RADIONUCLIDE CONTAMINATION ON FACE MASKS,
by E. M. Sheen and G. D. Crouch. Sep 65, 10p
Contract AT (45-1)-1830

Descriptors: (*Protective masks, Contamination), (*Radioactivity, Contamination).

COO-1170-4 **Field 6R**
CFSTI Prices: HC$3.00 MF$0.75
Iowa State Univ. of Science and Tech., Ames. Inst. for Atomic Research.
CRITICALLY CONTROLLED INHALATION STUDY OF PATHOGENESIS OF NEODYMIUM OXIDE IN MICE AND GUINEA PIGS,
by Fred C. Davison and Frank K. Ramsey. Jun 65, 77p
Contract AT (11-1)-1170

Descriptors: (*Toxicity, Respiratory systems), (*Respiratory systems, Radiation effects).

HW-SA-3679 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
ORAL THERAPY FOR DEPOSITED PLUTONIUM,
by J. E. Ballou and J. L. Palotay. 14 Aug 64, 10p
Contract AT (45-1)-1350

Descriptors: (*Radiotherapy, Plutonium), (*Plutonium, Radiation effects).

IDO-12042 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Idaho Operations Office (AEC), Idaho Falls. Health and Safety Div.
BIOLOGICAL AVAILABILITY OF RADIONUCLIDES IN CALCINED WASTE,
by John B. Echo. Jun 65, 7p

Descriptors: (*Isotope availability, Biology), (*Radiobiology, Radioactive isotopes).

NUS-217 **Field 6R, 9B**
CFSTI Prices: HC$3.00 MF$0.75
Nuclear Utility Services, Inc., Washington, D.C.
CALCULATIONAL MODELS FOR BETA DOSE FROM SPHERICAL PARTICLES,
by George H. Anno. 26 Feb 65, 83p

Descriptors: (*Dose rate, Beta particles), (*Programming (Computers), Dose rate).

NYO-2462-1A **Field 6C**
CFSTI Prices: HC$2.00 MF$0.50
State Univ. of New York, Buffalo. Dept. of Physics.
MONTE CARLO COMPUTATIONS OF TISSUE CELL GROWTH.
Final summary rept.,
by Joseph G. Hoffman. 1 Dec 64, 36p
Contract AT (30-1)-2462

Descriptors: (*Cells (Biology), Growth), (*Monte Carlo method, Growth).

NYO-3364-3 **Field 6R, 18H**
CFSTI Prices: HC$1.00 MF$0.50
Norsk Radiumhospital, Oslo.
137 CESIUM BODY BURDEN AND ITS VARIATION IN 22 NORWEGIAN SCHOOL BOYS.
1964, 16p
Contract AT (30-1)-3364

Descriptors: (*Radiation effects, Cesium), (*Radioactive fallout, Radiation effects).

ORNL-P-1339 **Field 6C**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
PROBABILISTIC ESTIMATES OF RANGE FORAGE INTAKE,
by G. M. Van Dyne. 1965, 6p CONF-650709-1
Contract W-7405-eng-26
Presented at American Society of Animal Science, Fort Collins, Colo.

Descriptors: (*Nutrition, Mammals).

ORNL-P-1340 **Field 6C, 2E**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
DISTANCE TRAVELED BY SHEEP ON WINTER RANGE,
by G. M. Van Dyne and J. L. Van Horn. 1964, 6p CONF-650709-2
Contract W-7405-eng-26
Presented at American Society of Animal Science, Fort Collins, Colo. Prepared in Cooperation with Montana State College, Bozeman.

Descriptors: (*Mammals, Environment).

ORO-626 **Field 6H, 6R**
CFSTI Prices: HC$2.00 MF$0.50
Louisa State Univ., Baton Rouge. Dept. of Food Science and Technology.
RADIATION PASTEURIZATION OF SHRIMP AND OYSTERS.
Final summary rept. for Jan-Dec 64,
by Arthur F. Novak. 15 Jan 65, 29p
Contract AT (40-1)-2951

Descriptors: (*Irradiated foods, Pasteurization), (*Pasteurization, Seafood).

Patent 3,221,339 **Field 6Q**
NECK SLEEVE FOR CONNECTING A HELMET TO A LIFE VEST.
Patent assigned to Navy,
by James V. Correale, Jr. 7 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Helmets, Fastenings), (*Pressure suits, Fastenings), Patents, Pilots, Design.

The device is for connecting a pressure suit helmet having a bayonet-type connecting ring around the neck hole with a pilot's life vest having a slide fastener around the neck opening. The device enables the use of one helmet under all conditions of flight altitude without the use of goggles and oxygen mask.

Patent 3,221,769 **Field 6E, 13G**
FUNCTIONAL CONTROL VALVES FOR PNEUMATIC PROTHESES.
Patent assigned to Army,
by Edward A. Kiessling. 7 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Prosthetics, Valves), (*Valves, Pneumatic devices), Patents, Control systems, Servomotors.

The functional control valves embody one or more basic valve modules adapted to control a corresponding number of functions of a pneumatic prosthetic device. The valves are actuated in various ways by the amputee by pulling, pressing and shifting motions. The valves control the flow of gas to and from a dual-acting servo motor.

PB-168 980 **Field 6F, 13B**
CFSTI Prices: HC$3.00 MF$0.75
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
PESTICIDES IN SOIL AND WATER: AN ANNOTATED BIBLIOGRAPHY.
Jul 64, 95p
PHS Pub-999-WP-17
Environmental Health Series. Water Supply and Pollution Control.

Descriptors: (*Pesticides, Bibliographies), Soils, Drainage, Water supplies, Environment, Contamination, Hazards, Sanitary eng-

The annotated bibliography is a review of the literature that falls within the interest of the land drainage and water treatment projects of the Engineering Section. Its scope embraces the following subjects: (1) Water solubility taste and odor, and volatility of specific compounds. (2) The occurrence, adsorption, and persistence of residues in soils. (3) The occurrence and persistence of residues in ground water and surface water. (4) Physical, chemical, and biochemical processes that lead to dissipation or degradation of residues. (5) The treatment of manufacturing plant wastes. (6) Detection and determination of pesticide residues in water.

PB-169 093 **Field 6L, 11I**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
THE EFFECT OF POLYMER SURFACES ON THE COAGULATION OF BLOOD.
Annual rept. no. 1,
by D. J. Lyman, I. J. Lee and W. M. Muir. 24 Nov 65, 44p
Contract PHS-PH-43-64-84,
Proj. SRI-FRU-5091

Descriptors: (*Blood coagulation, Plastics), (*Polymers, Compatibility), (*Plastics, Compatibility), (*Artificial organs, Materials), Reviews, Thermodynamics, Theory, Purification, Surface properties, In vitro analysis, Surface tension, Silicon compounds, Dioxides, Heparin, Thrombosis, Heart.

Identifiers: Free energy.

The literature concerning the adverse interaction of blood and plastics were reviewed and analyzed. An approach to the problem based on surface free energy effects was hypothesized. The surface free energy of materials that had been used experimentally in blood clotting studies was calculated, and a plot (semi-log) of these data vs. clotting time of dog and human blood gave a rather good linear relationship. Therefore, this approach was explored further experimentally. Preliminary work was on polymer purification, refinement of experimental techniques to determine surface free energy, and determination of the suitability of various in vitro clotting techniques for classifying polymers. (Author)

PB-169 175 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Civil Aeromedical Research Inst., Oklahoma City, Okla.
THE ANGLE OF SHOULDER SLOPE IN NORMAL MALES AS A FACTOR IN SHOULDER-HARNESS DESIGN,
by Clyde C. Snow and A. Howard Hasbrook.
Mar 65, 5p
AM 65-14

Descriptors: (*Antropometry, Aviation personnel), (*Safety harness, Design), Joints (Physiology), Arms, Flight clothing, Pilots, Males, Statistical analysis.

In order to establish criteria for more comfortable shoulder-harness design, this study was conducted to determine the angle of slope of the top of the shoulders where poorly fitting shoulder harness may produce discomfort and, occasionally, functional impairment through compression of the underlying soft tissues. The mean shoulder-slope angle (measured from the vertical body axis) of normal males based on this study of 55 Air Traffic Service trainees is 67.5 degrees with a standard deviation of 5.0 degrees. (Author)

RFP-510 **Field 6R, 7C**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
DIETHYLENE TRIAMINEPENTAACETIC ACID ANALYSIS AND EXCRETION FOLLOWING THERAPY FOR PLUTONIUM EXPOSURE,
by D. L. Bokowski and S. E. Hammond. 7 May 65, 25p CONF-650616-1
Contract AT (29-1)-1106
Presented at Health Physics Society, Annual Meeting, Los Angeles.

Descriptors: (*Radiotherapy, Acetic acids), (*Acetic acids, Excretion).

RFP-577 **Field 6R**
CFSTI Prices: HC$2.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
PLUTONIUM BIOASSAY RESULTS FOLLOWING DTPA TREATMENTS ON TWO CASES 7 YEARS AFTER ACCIDENTAL EXPOSURE,
by C. R. Lagerquist and S. E. Hammond. 23 Sep 65, 18p
Contract AT (29-1)-1106

Descriptors: (*Radiation effects, Plutonium), (*Plutonium, Radiation injuries).

SAN-536-10 **Field 6R, 6H**
CFSTI Prices: HC$2.00 MF$0.50
National Canners Association Research Foundation, Washington, D. C.
APPLICATION OF RADIOCHEMISTRY TECHNIQUES IN FOOD PROCESSING RESEARCH. RADIOISOTOPIC TRACER TECHNIQUES IN EVALUATION AND IMPROVEMENT OF INDUSTRY PRACTICES FOR REMOVAL OF PESTICIDE RESIDUES FROM FOODS.
Annual rept. no. 4,
ed. by Walter A. Mercer. 30 Nov 64, 48p
Contract AT (04-3)-536

Descriptors: (*Food, Radiochemistry), (*Tracer studies, Pesticides).

TID-21075 **Field 6R, 7E**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Baltimore, Md. School of Hygiene and Public Health.
THE POSSIBLE FORMATION OF DITHYMINE PEROXIDE IN IRRADIATED DNA,
by Shih Yi Wang and Raul Alcastara. 1964, 12p
Contract AT (30-1)-2798

Descriptors: (*Desoxyribonucleic acids, Radiation effects), (*Radiation effects, Desoxyribonucleic acids).

TID-21613 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Weizmann Inst. of Science, Rehovoth, Israel.
THE APPLICATION OF CLONED HAEMOPOIETIC CELLS IN RADIATION PROTECTION,
Progress rept.,
by Michael Feldman. 1965, 3p
Contract AT (30-1)-3173

Descriptors: (*Cells (Biology), Radiobiology), (*Radiation effects, Cells (Biology)).

TID-21641 **Field 6P, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Research and Advanced Development Div., AVCO Corp., Wilmington, Mass.
HUMAN CHROMOSOME ANALYSIS BY A SEMIAUTOMATIC SYSTEM.
Joint interim progress rept.,
by Peter W. Neurath and Arthur Falek. 19 Feb 1965, 20p
Contracts AT (30-1)-3400, AT-3381
Prepared in cooperation with New York State Psychiatric Inst., New York.

Descriptors: (*Chromosomes, Humans), (*Programming (Computers), Chromosomes).

TID-21780 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Hebrew Univ., Jerusalem (Israel).
THE ACTION OF RADIATIONS ON SOME BIOLOGICAL MODEL SYSTEMS.
Progress rept. 12 Jun 64-1 Apr 65,
by G. Stein. 1 Apr 65, 10p
Contract AT (30-1)-3242

Descriptors: (*Radiation effects, Biology).

TID-21791 **Field 6F, 6R**
CFSTI Prices: HC$3.00 MF$0.75
Georgia Univ., Athens. Inst. of Radiation Ecology.
A STUDY OF THE MOVEMENTS OF THE CHANNEL CATFISH, ICTALURUS LACUSTRIS PUNCTATUS, IN THE SAVANNAH RIVER AND ONE OF ITS TRIBUTARIES WITHIN THE AEC SAVANNAH RIVER OPERATIONS AREA,
by Robert L. Humphries. 1965, 62p
Contract AT907-2)-10

Descriptors: (*Fishes, Radiobiology), (*Ecology, Fishes).

TID-21932 **Field 6H, 18H**
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge.
SIMULTANEOUS RADIATION-HEATING TREATMENT OF HADDOCK,
by John T. R. Nickerson and Samuel A. Goldblith. 1965, 32p
Contract AT (30-1)-3343

Descriptors: (*Radiation damage, Fishes), (*Heat treatment, Food).

TID-21951 **Field 6R**
CFSTI Prices: HC$7.00 MF$1.75
Texas Technological Coll., Lubbock.
THE EFFECTS ON RAT BEHAVIOR OF DEVELOPMENTAL ABERRATIONS INDUCED BY IRRADIATION IN UTERO.
Final rept.,
by Robert K. White. 1965, 355p
Contract AT (40-1)-1982

Descriptors: (*Radiation effects, Rats), (*Rats, Embryos).

TID-21973 **Field 6R**
CFSTI Prices: HC$2.00 MF$0.50
John Collins Warren Labs., Massachusetts General Hospital, Boston.
AN INVESTIGATION ON THE MECHANISMS AND REGULATIONS OF NUCLEIC ACID AND PROTEIN SYNTHESIS, AND THEIR POSSIBLE RELATIONSHIP TO RADIATION DAMAGE.
Progress rept. for 1 Sep 64-31 Aug 65,
by Paul C. Zamecnik and Joseph W. Gardella. 31 Aug 65, 45p
Contract AT (30-1)-2643

Descriptors: (*Radiation effects, Nucleic acids), (*Proteins, Synthesis).

TID-22031 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Rockefeller Inst., New York.
GENETIC STRUCTURE OF NATURAL POPULATIONS.
Progress rept. for 1 Oct 64-1 Jun 65,
by Theodosius Dobzhansky. 1 Jun 65, 17p
Contract AT (30-1)-3096

Descriptors: (*Genetics, Radiobiology), (*Radiation effects, Genetics).

TID-22039 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Brandeis Univ., Waltham, Mass.
THE MOLECULAR BASIS FOR THE MUTAGENIC AND LETHAL EFFECTS OF ULTRAVIOLET IRRADIATION.
Progress rept. for 1 Sep 64-30 Jun 65,
by Lawrence Grossman. 30 Jun 65, 3p
Contract AT (30-1)-3449

Descriptors: (*Ultraviolet radiation, Radiation effects), (*Molecular structure, Ribonucleic acids).

UCRL-12006 **Field 6G**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
RESCUE BASKET,
by Roy Page. Aug 64, 7p
Contract W-7405-eng-48

Descriptors: (*Rescue kits, Hoists).

UCRL-14254 **Field 6A**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
A SCHEMATIC VIEW OF THE ORIGIN OF LIFE,
by Roger G. Hart. 11 Jun 65, 16p
Contract W-7405-eng-48

Descriptors: (*Biochemistry, Desoxyribonucleic acids).

UCRL-14505 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.

THE CALCULATION OF TREATMENT SCHEDULES FOR CANCER CHEMOTHERAPY,
by T. C. Merkel, R. N. Stuart, and J. W. Gofman. 13 Oct 65, 19p
Contract W-7405-eng-48

Descriptors: (*Chemotherapy, Cancer), (*Cancer, Chemotherapy).

UCRL-16053 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.
MODELS OF BLOOD CELL PROLIFERATION,
by Grove C. Nooney. Dec 64, 22p CONF-641217-1
Contract W-7405-eng-48
Presented at IBM Symposium on scientific computers, Yorktown Heights, N. Y.

Descriptors: (*Blood cells, Cell division), (*Cell division, Mathematical models).

UCRL-16154 **Field 6R**
CFSTI Prices: HC$4.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Berkeley.
RESULTS OF COMPUTATIONS OF DEPTH DOSE IN TISSUE IRRADIATED BY PHOTONS,
by Palmer G. Steward. 25 May 65, 117p
Contract W-7405-eng-48

Descriptors: (*Dose rate, Tissues (Biology), (*Tissues (Biology), Radiation effects).

UWFL-87 **Field 6R, 6H**
CFSTI Prices: HC$2.00 MF$0.75
Washington Univ., Seattle. Lab. of Radiation Biology.
RADIONUCLIDE CONTENT OF FOODSTUFFS COLLECTED AT CHRISTMAS ISLAND AND AT OTHER ISLANDS OF THE CENTRAL PACIFIC DURING OPERATION DOMINIC, 1962,
by Ralph F. Palumbo. 1 Aug 63, 38p
Contract AT(45-1)-1385

Descriptors: (*Radioactive isotopes, Food), (*Food, Pacific Ocean islands).

WASH-1063 **Field 6H, 6R, 18B**
CFSTI Prices: HC$1.00 MF$0.50
Library of Congress, Washington, D. C. Science and Technology Div.
WORLD OUTLOOK FOR FOOD IRRADIATION,
by F. J. Weiss. 1964, 9p CONF-629-4
Prepared for presentation at Annual Meeting of the Institute of Food Technologists (24th), Washington, D. C., May 1964.

Descriptors: (*Irradiated foods, Preparation).

7. CHEMISTRY

AD-425 536 **Field 7C**
CFSTI Price: HC$2.00
Mallinckrodt Chemical Lab., Harvard Univ., Cambridge, Mass.
SILYL-SUBSTITUTED CARBODIIMIDES,
by Joachim Pump, Eugene G. Rochow, and Ulrich Wannagat. 20 Sep 63, 50p
Contract SD-88
ARPA TR-2

Descriptors: (*Silicon compounds, Imides), (*Imides, Silicon compounds), Synthesis (Chemistry), Molecular structure, Nuclear magnetic resonance, Spectra (Infrared), Raman spectroscopy.

Identifiers: Silyl carbodiimides.

Nine bis-silyl-substituted carbodiimides of the types (R3SiN)2C, (RO)3SiN)2C, (R2R'SiN)2C and R3SiNCNSiR3' were prepared for the first time. Their structure was established by H1- and N14-NMR measurements, IR and Raman spectra. (Author)

AD-447 385 **Field 7B, 11F**
CFSTI Price: HC$3.00
Tennessee Univ., Knoxville.
OXIDATION OF CESIUM AT LOW TEMPERATURES AND PRESSURES.
Final rept.,
by J. E. Epperson and E. E. Stansbury. Sep 64, 60p
Contract AF40(600)-1023,
Proj. AF-6950,
Task 695003
AEDC TDR-64-195,
N64 31042

Descriptors: (*Cesium, Oxidation), (*Oxidation, Cesium), (*Low pressure research, Cesium), Cesium compounds, Oxides, Reaction kinetics, Low-temperature research, Phase studies, Films, Alkali metal compounds, Ion engines. Rocket propellants, Alkali metals.

The rate of reaction of Cs with O at reduced pressures, principally in the range of 0.0001 to 0.000001 torr, was measured at 0, -35, -63, and -78C. At 0C the rate of reaction was very sensitive to the O pressure in the range 0.0001 to 0.000001 torr. The initial rates of reaction were about 0.005 times the calculated maximum rates based on the assumption that every molecule of O striking the surface is absorbed. From the phase diagram of the Cs-Cs2O system, it is predicted that the layer of reaction products at 0C is probably composed of a layer of O-rich Cs liquid and a 'crust' of one or more solid phases. The rate determining step probably was a reaction at the oxide-gas interface, the rate of which was governed by the O pressure. At -35.5C the rates of reaction were initially about an order of magnitude lower than those observed at 0C; however, after the film had reached a nominal thickness of about 2000 to 3000 angstroms, an abrupt increase in the rate was observed. At -63 and -78C a continued decrease in rate of reaction was observed. Two survey runs were made at O pressures of 0.01 and 0.5 torr.

AD-455 623 **Field 7E, 7C, 11I**
CFSTI Price: HC$1.00
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
UTILIZATION OF GAMMA RADIATION TO ENHANCE PROPERTIES OF POLYMERS AND TO INITIATE POLYMERIZATION OF MONOMERS.
Progress rept. no. 1, 23 Mar-15 Dec 64,
by G. Hargreaves and W. W. Howerton. 15 Dec 64, 18p
Proj. NAEC-AML(36)-R360FR101

Descriptors: (*Radiation chemistry, Polymers), (*Polymers, Radiation chemistry), Polymerization, Reviews, Scientific research, Gamma rays, Mechanical properties, Physical properties, Radiation damage, Bibliographies, Polyethylene plastics, Polyvinyl chloride, Halocarbon plastics, Silicone plastics, Laminated plastics, Acrylic resins, Nylon, Styrene plastics.

A brief summary of planned work and a synopsis of work to date with some of the problems involved are given. A literature survey and bibliography are presented. (Author)

AD-465 910 **Field 7C, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Frick Chemical Lab., Princeton Univ., N. J.
VISCOELASTIC PROPERTIES OF PHOSPHINATE POLYMERS,
by A. D. Mair and A. V. Tobolsky. Jun 65, 25p
Technical rept. no. RLT-89
Contract Nonr-1858(07),
Proj. NR-356-377

Descriptors: (*Polymers, Viscoelasticity), (*Organic phosphorus compounds, Polymers), Metalorganic compounds, Aromatic compounds, Hydrocarbons, Temperature, Measurement, Equations, Stresses, Creep.

The viscoelastic properties of several phosphinate inorganic coordination polymers have been investigated. By utilizing a ball-indentation method, the creep compliance, J sub c (t), has been measured as a function of time for two samples of zinc methylphenylphosphinate of differing molecular weight. From results at different temperatures, master curves of compliance versus time could be constructed using the time-temperature superposition principle. The creep behavior for both samples was found to be a fair approximation to that of a Maxwell body; it is thus concluded that both polymers are of low molecular weight in the solid state. The temperature dependence of the shift factors, used in constructing the master curve, is of an Arrhenius form over most of the temperature range considered, giving apparent activation energies of 90 and 80 kcal/mole for lower and higher molecular weight samples respectively. Volume temperature measurements indicate that the glass transition temperature, T sub g, for the higher molecular weight polymer is 56C. The elastic modulus of a 1:1 copolymer of zinc di-n-butylphosphinate and zinc di-n-octylphosphinate has been measured as a function of time and of temperature using torsional creep and stress relaxation techniques. Results indicate that this copolymer is slightly crystalline, a conclusion supported by X-ray studies. From comparisons of creep behavior, the copolymer appears to be of higher molecular weight than the zinc methylphenylphosphinate samples. (Author)

AD-466 383 **Field 7B, 7D**
CFSTI Prices: HC$2.00 MF$0.50
TRACOR, Inc., Austin, Tex.
ELECTROCHEMICAL STUDIES IN THE SYNTHESIS OF N-F COMPOUNDS.
Quarterly status rept. no. 9, 1 Jan-31 Mar 65,
by Larry G. Spears, Larry D. Fiel, Wallace E. Harrell, Jr. and Margaret H. Northrup. 30 Jun 65, 31p TRACOR-65-224-U
Contract Nonr-4054(00), ARPA Order-399,
Proj. RR-001-06-02
N65 29254
See also AD-614 098.

Descriptors: (*Nitrogen compounds, Quantitative analysis), (*Fluorine, Quantitative analysis), (*Electrodes, Cor -rosion), (*Oxidizers, Synthesis (Chemistry)), Nickel alloys, Iron alloys, Chromium alloys, Titanium alloys, Degradation, Polarization, Electrochemistry, Spectra (Infrared), Gas chromatography.

Identifiers: Inconel, Incoloy, Ni-span.

Work was devoted to the development of analytical methods for quantitative determination of N-F compounds and F2, and to the investigation of possible new electrode materials. Weight loss measurements, at open circuit and at constant anodic potential were performed on Incoloy 800, Inconel 600, and Ni-Span-C 902. Weight loss rates generally increased with increasing iron content and decreasing nickel content on these alloys. Weight loss measurements and polarization studies were performed on nickel in HF at various water concentrations. The addition of at least 0.01% H2O reduced corrosion rates of nickel at 6.0 volts. The polarization curves showed a peak dependent on the water concentration on the initial run and a water-dependent plateau in the successive curves. (Author)

AD-467 174 **Field 7E, 7C, 11I**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
UTILIZATION OF GAMMA RADIATION TO ENHANCE THE PROPERTIES OF POLYMERS AND TO INITIATE POLYMERIZATION OF MONOMERS.
Progress rept. no. 2, 15 Dec 64-15 Jun 65,
by G. Hargreaves. 15 Jun 65, 13p
Proj. NAEC-AML(36)-R360FR101

Descriptors: (*Radiation chemistry, Polymers), (*Polymers, Radiation chemistry), Polymerization, Gamma rays, Feasibility

studies, Processing, Ketones, Aromatic compounds, Spectra (Infrared), Adhesion, Epoxy plastics, Organic solvents, Solutions, Alcohols.

Preliminary studies to develop capability in the use of gamma radiation to dnduce polymerization have been completed. Some attempts to produce polymers from some monomers are now underway. Results and future plans are discussed. (Author)

AD-468 316 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
ARO, Inc., Arnold Air Force Station, Tenn.
ADSORPTION OF HYDROGEN BY A THIN FILM OF TITANIUM,
by S. M. Kindall. Aug 65, 50p
Contract AF40 (600)-1200,
Projs. AF-8951, ARO-SW3417,
Task 895104
AEDC TR-65-113

Descriptors: (*Metal films, Titanium), (*Titanium, Adsorption), (*Hydrogen, Adsorption), (*Adsorption, Hydrogen), Surfaces, Surface properties, Vapor plating, Controlled atmospheres, Helium, Low-temperature research, Diffusion, Mathematical models, Vacuum apparatus, Space environmental conditions, Simulation.

Past experience has shown that the capture coefficient of a titanium surface for hydrogen is strongly dependent upon the surface temperature and the conditions under which the film is formed. This report presents the results of an investigation which determined the importance of some of the variables. It was found that the capture coefficient increased as the titanium surface temperature was decreased from 273 to 77K. Moreover, the capture coefficient could be further increased by lowering the temperature of the substrate upon which the titanium film was deposited from 273 to 77K. Also, the capture coefficient was found to be independent of film thickness and chamber pressure but increased when the deposition was carried out in an inert helium atmosphere. For the range of conditions investigated, the sticking fraction was found to vary from 0.01 to 0.5. The experimental data suggest that surface diffusion is an important part of the mechanism by which titanium captures hydrogen. Calculations using a theoretical model which incorporates diffusion agreed well with the experimental results. (Author)

BDX-613-48 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Bendix Corp., Kansas, City, Mo.
STRUCTURAL STUDIES OF RIGID URETHANE FOAMS.
Final rept.
by C. J. Wiegand. Sep 30 63, 19p
Contract AT (29-1)-613,
Projs. MRI-2678-C- (2), Bendix-61433,
Task 2
Subcontracted to Midwest Research Inst.

Descriptors: (*Foams, Structural properties).

BNL-930 **Field 7D, 20B**
CFSTI Prices: HC$1.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
CHEMICAL CRYSTALLOGRAPHY,
by Walter C. Hamilton. 12 May 65, 15p
Contract AT (30-2)-GEN-16

Descriptors: (*Crystallography, Chemistry).

BNL-9384 **Field 7E, 6E**
CFSTI Prices: HC$2.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
A DATA PROCESSING METHOD FOR A MULTIDETECTOR POSITRON SCANNER,
by S. R. Bozzo and J. S. Robertson. 1965, 26p
CONF-650544-1
Contract AT (30-2)-GEN-16
Prepared for presentation to Symposium on Fundamental Problems in Scanning, Chicago.

Descriptors: (*Tracer studies, Scanning), (*Data processing systems, Tracer studies).

BNWL-68 **Field 7E, 7D, 7C**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
SOLVENT EXTRACTION OF CESIUM FROM HANFORD ALKALINE SUPERNATE BY 4-SEC-BUTYL-2 (ALPHA- METHYLBENEZYL) PHENOL- LABORATORY STUDIES,
by L. A. Bray. Aug 65, 18p
Contract AT (45-1)-1830

Descriptors: (*Solvent extraction, Cesium), (*Organic compounds, Solvent extraction).

C13.10-260-8 **Field 7B, 14B**
CFSTI Price: MF$0.75
National Bureau of Standards, Washington, D.C. Inst. for Materials Research.
STANDARD REFERENCE MATERIALS: ANALYSIS OF URANIUM CONCENTRATES AT THE NATIONAL BUREAU OF STANDARDS,
by M. S. Richmond. 1 Dec 65, 108p NBS Miscellaneous Pub-260-8
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.55.

Descriptors: (*Uranium, Chemical analysis), (*Chemical analysis, Standards), Ores (Metal sources), Test methods.

NBS experiences with the problems of assaying uranium concentrates are described. Umpire determinations of uranium were performed on several thousands of ore concentrates from world-wide sources. Contributions were made to the resolution of the sampling base line problem. Also, it was demonstrated that the standard U308, NBS No. 950a, provides the over-all standard necessary for precise assay of uranium materials. A comprehensive analytical procedure applicable to all types of uranium concentrates is presented. (Author)

C13.46-274 **Field 7C, 7E**
CFSTI Price: MF$0.75
National Bureau of Standards, Washington, D.C. Organic Chemistry Section.
ORGANIC CHEMISTRY: RADIOACTIVE CARBOHYDRATES, SUGARS IN SOLUTION, ALDOL CONDENSATIONS, MOLECULAR STRUCTURE, SYNTHESIS OF SELECTED COMPOUNDS, AIR POLUTION STUDIES, REFERENCE MATERIALS (ORGANIC) JULY 1964 TO JUNE 1965.
Technical note,
by Horace S. Isbell. 3 Dec 65, 123p
NBS TN-274
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20402, $0.60.

Descriptors: (*Organic compounds, Reviews), (*Carbohydrates, Reviews), (*Condensation reactions, Reviews), (*Molecular structure, Reviews), (*Air pollution, Reviews), Labelled substances, Stereochemistry, Solutions, Synthesis (Chemistry), Standards, Metalorganic compounds, Chemical analysis.

The report describes work in progress in the Organic Chemistry Section at the National Bureau of Standards on the following subjects: Synthesis of carbon-14- and tritium-labeled carbohydrates, isotope dilution and double-lavel methods of analysis, determination of kinetic isotope effects, use of solvent isotope-effects for studying pyranose-furanose interconversions, measurements of rates of primary enolization, rates of rearrangement of one sugar to another by bases, estimation of the relative stabilities of isomeric hexoses, reversible aldol condensations, mechanism for the formation of saccharinic acids, formation of branchedchain aldoses and linear ketoses by aldol condensations, stereochemistry of monoaminotetrahydroxycyclopentane derivatives, cyclic polyhydroxy ketones, phenylhydrazonophenylazot automerism, acetamido-deoxyketoses, syntheses and properties of selected organic compounds, interaction of aromatic hydrocarbons with oxygen, oxidation of polycyclic, aromatic hydrocarbons on particulate matter, loss on filtration of aqueous solutions of polycyclic, aromatic hydrocarbons, oxidation products of pyrene, and preparation of 1-phenyl-1,3-butanedione chelates of chromium and iron for use as new metallo-organic standards. (Author)

CONF-650411-4 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Pratt and Whitney Aircraft, Middletown, Conn. Connecticut Aircraft Nuclear Engine Lab.
SOLUBILITY STUDIES IN ALKALI METALS,
by S. S. Blecherman, G. F. Schenck, andR. E. Clearyl. 21 Apr 65, 10p
Contract AT (30-1)-2789
Prepared for presentation at Joint NASA - AEC Liquid Metals Corrosion Meeting, Gatlinburg, Tenn.

Descriptors: (*Liquid metals, Solutions), (*Alkali metals, Solubility).

COO-1224-8 **Field 7E, 7C**
CFSTI Prices: HC$3.00 MF$0.75
Illinois Inst. of Tech., Chicago.
RADIATION EFFECTS ON THE PHYSICAL PROPERTIES OF POLYMETHYL-METHACRYLATE.
Master's thesis,
by Mohammad Taghi Alizadeh Toosi. Jun 65, 70p
Contract AT (11-1)-1224
Submitted to Illinois Inst. of Tech., Chicago.

Descriptors: (*Radiation damage, Acrylic resins), (*Acrylic resins, Physical properties).

COO-1354-5 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
Dordt Coll., Sioux Center, Iowa. Dept. of Chemistry.
THE BEHAVIOR OF AQUEOUS SALTS IN CONTACT WITH OXIDE SURFACES,
by Russell W. Maatman. 1965, 26p CONF-650902-5
Contract AT (11-1)-1354
Presented at American Chemical Society National Meeting, (150th), Atlantic City, 12-17 Sep 1965.

Descriptors: (*Surface properties, Oxides), (*Oxides, Salts).

DP-980 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont De Nemours (E.I.) and Co., Aiken, S.C. Savannah River Lab.
APPLICATIONS OF ATOMIC ABSORPTION SPECTROSCOPY,
by J. Allen Wheat. Jul 65, 20p
Contract AT (07-2)-1

Descriptors: (*Atomic spectroscopy, Absorption spectrum), (*Absorption spectrum, Atomic spectroscopy).

GNEC-320 **Field 7E, 7B**
CFSTI Prices: HC$3.00 MF$0.75
General Nuclear Engineering Corp., Dunedin, Fla.
INVESTIGATION OF CATALYTIC RECOMBINATION OF RADIOLYTIC OXYGEN AND HYDROGEN,
Quarterly progress rept. no. 1, Oct-Dec 63,
by Gilbert M. Brown, George E. Panter, andC. Thomas Sawyer. 10 Jan 64, 54p EURAEC-991
Contract AT (40-1)-3151

Descriptors: (*Oxygen, Recombination reactions), (*Hydrogen, Recombination reactions).

HNS-1229-57 Field 7E
CFSTI Prices: HC$2.00 MF$0.50
Hazleton-Nuclear Science Corp., Palo Alto, Calif.
A RADIOACTIVE XENON ANALYTICAL FACILITY,
by W. R. Schell and C. L. Carnahan. 26 Jan 65, 30p
Contract AT (29-2)-1229

Descriptors: (*Xenon, Radioactive isotopes), (*Chemical analysis, Xenon).

HW-SA-3476 Field 7D
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
RATE AND FORMATION CONSTANTS FROM OXIDATION-REDUCTION REACTION DATA,
by J. C. Sheppard. 4 May 64, 6p CONF-600-5
Contract AT (45-1)-1350
Presented at American Chemical Society Northwest Regional Meeting, Spokane, Wash., June 1964.

Descriptors: (*Oxidation-reduction reactions, Reaction kinetics).

HW-65531 Field 7A
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
INFORMATION FOR APPLICATION ON IN-TANK BORON MONITORS,
by J. D. Lodge. 10 Jun 60, 11p
Contract AT (45-1)-1350

Descriptors: (*Boron, Concentration (Chemistry)), (*Monitors, Boron).

HW-74036 Field 7E, 7A
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
REPORT OF INVENTION--IMPROVEMENTS OF STRONTIUM SULFATE PRECIPITATION PROCESS,
by H. H. Van Tuyl. 18 Jun 62, 7p

Descriptors: (*Strontium compounds, Chemical precipitation).

Identifiers: Strontium sulfate.

HW-80298 Field 7E, 7A
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
PROMETHIUM PURIFICATION AT THE STRONTIUM SEMIWORKS,
by S. J. Beard, A. L. Boldt, and J. B. Kendall. 15 Jan 64, 11p
Contract AT (45-1)-1350

Descriptors: (*Promethium, Purification).

IS-T-32 Field 7D, 7C
CFSTI Prices: HC$2.00 MF$0.50
Ames Lab., Iowa State Univ. of Science and Tech.
EQUILIBRIUM DATA FOR THE TBP-D2EHPA-Nd(NO3)3-HNO3 SYSTEM.
Master's thesis,
by Jimmie Alan Chittenden. Jul 65, 28p
Contract W-7405-eng-82

Descriptors: (*Chemical equilibrium, Nitrates), (*Solvent extraction, Chemical equilibrium).

KY-485 Field 7D, 18D
CFSTI Prices: HC$1.00 MF$0.50
Paducah Gaseous Diffusion Plant, Ky.
A CHROMATOGRAPH FOR THE ANALYSIS OF HIGHLY REACTIVE AND CORROSIVE COMPOUNDS,
by K. L. Williamson, C. M. Johnson, and T. J. Mayo. 8 Jul 65, 21p
Contract W-7405-eng-26

Descriptors: (*Chromatographic analysis, Corrosive gases).

LA-3331 Field 7D, 20M
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
HEAT CAPACITIES OF NBC9.702, NbC0.702, NbC0.825 and NbC BELOW 320 DEG K,
by T. A. Sandenaw and E. K. Storme. Jul 65, 8p
Contract W-7405-eng-36

Descriptors: (*Thermal properties, Niobium compounds), (*Niobium compounds, Carbon compounds).

MIT-334-11 Field 7E, 18J
CFSTI Prices: HC$4.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Dept. of Nuclear Engineering.
THE NATURE OF THE HIGH BOILER DEGRADATION PRODUCTS FROM IRRADIATED SANTOWAX OMP,
by W. N. Bley and E. A. Mason. 1 Feb 65, 102p MITNE-55
Contract AT (38-1)-334

Descriptors: (*Degradation, Polycylic compounds), (*Polycyclic compounds, Radiation damage).

Identifiers: Diphenyl benzenes.

NYO-1938-2 Field 7D
CFSTI Prices: HC$1.00 MF$0.50
New York Univ., New York.
ELECTRO-OSMOSIS IN CONCENTRATED AQUEOUS SOLUTIONS.
Technical progress rept.
1965, 14p
Contract AT (30-1)-1938

Descriptors: (*Electroosmosis, Solutions).

NYO-2499-16 Field 7D
CFSTI Prices: HC$1.00 MF$0.50
Brandeis Univ., Waltham, Mass. Dept. of Chemistry.
ACTION OF MERCAPTAN AND DISULFIDE IN HYDROGEN ATOM EXCHANGE REACTIONS,
by Saul G. Cohen. 1 May 65, 25p CONF-650549-20
Contract AT (30-1)-2499
Presented at IAEA Symposium on Exchange Reactions, Upton, N. Y.

Descriptors: (*Exchange reactions, Hydrogen), (*Sulfides, Exchange reactions).

NYO-3185-1 Field 7C, 7E
CFSTI Prices: HC$3.00 MF$0.75
New York Univ., N. Y. Research Div.
COMBINED EFFECTS OF ULTRA-HIGH PRESSURE AND RADIATION ON ORGANIC MONOMERS AND POLYMERS.
Final rept. 1 Mar-63-31 Oct 64,
by Martin Prince. 31 Oct 64, 92p
Contract AT (30-1)-3185

Descriptors: (*Radiation damage, Organic compounds), (*Organic compounds, Pressure).

NYO-7240 Field 7D
CFSTI Prices: HC$3.00 MF$0.75
Providence Coll., R. I.
THE STUDY OF GASEOUS NEGATIVE IONS FORMED BY ELECTRON IMPACT.
Annual rept., 1 Dec 57-30 Nov 58,
by Morton A. Fineman, Americo W. Petrocelli, and Ronald Deignault. 1958, 74p
Contract AT (30-1)-1670

Descriptors: (*Gas ionization, Electron bombardment).

ORNL-P-1366 Field 7D
CFSTI Prices: HC$1.00 MF$0.50
Hollins Coll., Va. Oak Ridge National Lab., Tenn.
INFRARED SPECTROSCOPIC STUDY OF CONDENSED PHASE TRANSITION IN CF4.
by Ralph G. Steinhardt, Jr., Walter Neilsen, Henry W. Morgan, and Percy Staats. 1964, 22p CONF-650630-1
Contract W-7405-eng-26
Presented at Society of Physical Chemistry Annual Meeting (15th), Paris. Prepared in Cooperation with Oak Ridge National Lab., Tennessee.

Descriptors: (*Phase studies, Carbon compounds), (*Infrared spectroscopy, Fluorides).

ORNL-P-971 Field 7D
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
STUDIES OF THE BEHAVIOR OF PROTACTINIUM IN SULFURIC ACID,
by D. O. Campbell. 8 Jan 65, 13p
Contract W-7405-eng-26
Prepared for presentation at Colloquium on Physical Chemistry, Marseille, France.

Descriptors: (*Protactinium, Sulfuric acid), (*Solvent extraction, Protactinium).

ORNL-3832 Field 7B, 7C, 7D, 7E
CFSTI Prices: HC$5.00 MF$1.00
Oak Ridge National Lab., Tenn.
CHEMISTRY DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING MAY 20, 1965.
Sep 65, 175p
Contract W-7405-eng-26

Descriptors: (*Radiation chemistry, Radioisotopes), (*Organic chemistry, Physical chemistry).

ORO-592 Field 7D
CFSTI Prices: HC$2.00 MF$0.50
Research Triangle Inst., Durham, N. C. Measurement and Controls Lab.
A DISSOLVED OXYGEN ANALYZER.
Final rept.,
by Arthur S. Gillespie, Jr. and Harold G. Richter. 31 Dec 63, 36p RTI-2513-T11
Contract AT (40-1)-2513,
Task 11

Descriptors: (*Chemical analysis, Oxygen), (*Oxygen, Chemical analysis).

ORO-593 Field 7E, 13B, 8H, 18H
CFSTI Prices: HC$1.00 MF$0.50
Research Triangle Inst., Durham, N. C. Measurement and Controls Lab.
A TECHNIQUE FOR THE RAPID ANALYSIS OF FALLOUT ACTIVITIES IN NATURAL WATERS.
Final rept.,
by Harold G. Richter and Donald L. Wright. 31 Mar 65, 22p RTI-3070
Contract AT (40-1)-3070

Descriptors: (*Radioactive fallout, Analysis), (*Water, Radioactive fallout).

ORO-628 **Field 7E, 7C**
CFSTI Prices: HC$4.00 MF$0.75
West Virginia Univ., Morgantown. Engineering Experiment Station.
PREPARATION OF WOOD-PLASTIC COMBINATIONS USING GAMMA RADIATION TO INDUCE POLYMERIZATION,
by James A. Kent, Anthony Winston, William R. Boyle, Wesley Loos, and Joseph E. Ayers. 14 May 65, 112p
Contract AT (40-1)-2945

Descriptors: (*Polymerization, Gamma rays), (*Wood, Plastics).

ORO-633 **Field 7C, 7E, 18B**
CFSTI Prices: HC$2.00 MF$0.50
Spindletop Research, Lexington, Ky.
INVESTIGATION OF THE PYROLYTIC PRODUCTS OF IRRADIATED CIGARETTES,
by Herman V. Boenig. Oct 65, 36p
Contract AT (40-1)-3268

Descriptors: (*Tobacco, Pyrolysis).

PB-169 047 **Field 7B, 7A**
CFSTI Prices: HC$10.50 MF$3.00
Southwest Research Inst., San Antonio, Tex. Dept. of Chemistry and Chemical Engineering.
CHLORATES AND PERCHLORATES: THEIR MANUFACTURE, PROPERTIES AND USES,
by Francis A. Warren, John D. Millar, Franklin E. Massoth, William E. Hensel, and Irwin A. Raben. 15 May 60, 747p
Contract NOrd-18471
NAVORED 7147-Vol-1,
AD 242 192

Descriptors: (*Oxidizers, Oxychlorides), (*Chlorates, Reviews), (*Perchlorates, Reviews), Manufacturing methods, Industrial equipment, Specifications, Economics, Chemical reactions, Reaction kinetics, Bleaching agents, Pyrotechnics, Explosive materials, Solid rocket oxidizers, Herbicides, Dessicants, Absorption, Composite propellants.

A summary is given of the available information on inorganic chlorate and perchlorate compounds. Topics covered include manufacturing process descriptions; process equipment; recent process developments; product specifications; economics; reactions and reaction mechanisms; and applications to bleaching, pyrotechnics, explosives (including propellants), herbicides, and drying and absorptive agents.

PB-169 072 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Dept. of Geology and Geophysics.
DETERMINATION OF CARBON, OXYGEN, AND SILICON IN SOLIDS BY RADIOACTIVATION WITH 15 M.E.V. DEUTERONS,
by John W. Winchester and Michael L. Bottino. 4 Nov 60, 7p
Grant NSF-G6066

Descriptors: (*Radioactivation analysis, Deuteron bombardment), (*Carbon, Radioactivation analysis), (*Oxygen, Radioactivation analysis), (*Silicon, Radioactivation analysis), Feasibility studies, Annihilation radiation, Gamma rays, Beta particles, Scintillation counters, Cyclotrons.

Experiments were carried out to test the possibility of determining small amounts of carbon in pure silicon dioxide by means of radioactivation with cyclotron deuterons of 15 m.e.v. The results show that it is feasible to carry out the analysis for as little as a few tenths of a per cent C in Si02 by counting induced positron radioactivity in the bombarded sample without chemical processing. From the data the ratio of Si to 0 may also be estimated. The principal limit on the sensitivity for detecting C is the large amount of 0 present; for samples lower in 0 sensitivity should be much better.

PB-169 074 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Dept. of Geology and Geophysics.
THE USE OF 15M.E.V. DEUTERONS FOR THE DETERMINATION OF CARBON, OXYGEN, AND SILICON IN SOLID MATERIALS BY RADIOACTIVATION ANALYSIS.
Progress rept.,
by John W. Winchester. 26 Oct 60, 29p
Grant NSF-G6066

Descriptors: (*Refractory materials, Radioactivation analysis), (*Carbon, Radioactivation analysis), (*Oxygen, Radioactivation analysis), (*Silicon, Radioactivation analysis), Feasibility studies, Gamma rays, Bata particles, Scintillation counters, Deuteron bombardment, Cyclotrons.

Experiments have been carried out to test the feasibility of radioactivation analysis for carbon, oxygen, and silicon using 15 m.e.v. deuterons from the M.I.T. Cyclotron. Samples were bombarded on a stationary target placed in the external beam of the Cyclotron, and induced 10 min. N13, 112 min. F18, and 157 min. Si31 were measured by counting positron annihiliation gamma radiation and beta radiation in a scintillation spectrometer and an end-window proportional counter. As low as 0.01% C in SiO2 may be detected without chemical separation by gamma decay curve resolution, and above 0.1% C the precision of replicate samples bombarded at the same time is a few per cent. The stoichiometry of SiO2 may be determined to a precision of a few per cent by simultaneous beta and gamma counting of the bombarded sample. Detection of trace oxygen in materials by cyclotron bombardment in general requires chemical separation of induced 112 min. F18 radioactivity. (Author)

RFP-111 **Field 7D, 11C**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Plant, Dow Chemical Co., Denver, Colo.
RAPID ANALYSIS OF CADMIUM CYANIDE PLATING SOLUTIONS,
by J. T. Byrne, J. L. Pflug and A. K. Williams. 27 Jul 59, 19p
Contract AT (29-1)-1106

Descriptors: (*Plating, Solutions), (*Cyanides, Cadmium compounds).

RFP-618 **Field 7E, 18D**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
RADIOMETRIC DETERMINATION OF FLUORINE IN BULK PLUTONIUM TETRAFLUORIDE,
by K. C. Long, O. H. Willoughby, and D. R. Cartwright. 17 Sep 65, 10p
Contract AT (29-1)-1106

Descriptors: (*Fluorine, Radiation chemistry), (*Plutonium compounds, Fluorides).

RL-SA-38 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
A REFINED SPECTROPHOTOMETRIC DETERMINATION OF URANIUM WITH 1- (2-PYRIDYLAZO)-2NAPHTHOL,
by D. L. Anderson and H. E. Smith. 19 May 65, 13p CONF-650613-2
Contract AT (45-1)-1350
Presented at American Chemical Society Northwest Regional Meeting (20th), Corvallis, Ore., 14-15 Jun 1965.

Descriptors: (*Uranium, Spectrophotometers), (*Chemical analysis, Uranium).

RL-SA-9 **Field 7A, 7E, 18G**
CFSTI Prices: HC$2.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
COUNTER-CURRENT CRYSTALLIZATION,
by W. L. Godfrey. Dec 64, 37p
Contract AT (45-1)-1350

Descriptors: (*Plutonium, Separation), (*Crystallization, Fission products).

SC-TM-65-183 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
THE KINETICS OF THE REACTIONS OF KO2 AND KOH WITH WATER,
by R. E. Cuthrell. Apr 65, 14p
Contract AT (29-1)-789

Descriptors: (*Reaction kinetics, Potassium compounds), (*Potassium compounds, Water).

SRIA-425-5 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
SORPTION OF GASES ON METAL SURFACES IN ULTRAHIGH VACUUM.
Quarterly progress rept no. 10, Feb 15-May 15,
by B. Bergamov-Hansen, N. Endow and R. A. Pasternak. 21 May 65, 12p
Contract AT (04-3)-425

Descriptors: (*Sorption, Metals), (*Surface properties, Vacuum).

TID-21573 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
Utah Univ., Salt Lake City.
THE EFFECT OF GEOMETRIC FACTORS IN SURFACE REACTION SYSTEMS.
Technical rept no. 48,
by Linden A. Pember and Milton E. Wadsworth. 9 Nov 64, 42p
Contract AT (11-1)-1144

Descriptors: (*Reaction kinetics, Surfaces), (*Geometry, Reaction kinetics).

TID-21683 **Field 7E, 7C**
CFSTI Prices: HC$2.00 MF$0.50
Camille Dreyfus Lab., Research Triangle Inst., Durham, N. C.
RADIATION INDUCED EMULSION POLYMERIZATION.
Technical progress rept. for 1 Feb-30 Nov 64,
by V. T. Stannett. 23 Dec 64, 32p
Contract AT (40-1)-2513,
Task 17

Descriptors: (*Polymerization, Radiation chemistry), (*Radiation chemistry, Polymerization)

TID-21881 **Field 7E, 20D**
CFSTI Prices: HC$2.00 MF$0.50
Research Triangle Inst., Durham, N. C. Measurement and Controls Lab.
A RADIO-RELEASE TECHNIQUE FOR TRACING STREAM FLOWS.
Final rept.,
by Harold G. Richter and Arthur S. Gillespie, Jr. 31 Aug 64, 38p
Contract AT (40-1)-2513,
Proj. RTI-NU-145,
Task 16

Descriptors: (*Tracer studies, Fluid flow), (*Fluid flow, Tracer studies).

TID-21885 **Field 7E, 7C**
CFSTI Prices: HC$3.00 MF$0.75
Maryland Univ., College Park. Dept. of Chemical Engineering.

HOMOGENEOUS AND GRAFT COPOLYMERIZATION OF STYRENE BY IONIZING RADIATION.
Doctoral thesis,
by Sundaresa Srinivasan. 1965, 75p
Contract AT (40-1)-2845

Descriptors: (*Polymerization, Styrenes), (*Radiation chemistry, Polymerization).

TID-21952 **Field 7C, 7D**
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Univ., Amherst. Polymer Research Inst.
AN AUTOMATIC X-RAY DIFFRACTOMETER FOR POLE-FIGURE ANALYSIS OF POLYMER ORIENTATION.
Technical rept.,
by C. Richard Desper. 15 Jan 65, 90p TR-78
Contracts AT (30-1)-3003-2, Nonr-3357 (01),
Proj. NR-056-378

Descriptors: (*Polymers, X-ray diffraction analysis), (*X-ray diffraction analysis, Automatic).

TID-22060 **Field 7E, 7D**
CFSTI Prices: HC$4.00 MF$1.00
State Univ. of New York, Buffalo. Dept. of Chemistry.
STUDIES IN SOLUTION AND NUCLEAR CHEMISTRY.
Progress rept. for 1 Oct 64-30 Sep 65,
by Jacob A. Marinsky and George A. Clarke. 1 Jul 65, 143p
Contract AT (30-1)-2269

Descriptors: (*Radiation chemistry, Solutions), (*Solutions, Radiation chemistry).

TID-22063 **Field 7C, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Oklahoma Univ. Research Inst., Norman.
SPECTROSCOPIC PROPERTIES OF FLUOROCARBONS AND FLUORINATED HYDROCARBONS.
Final rept.,
by J. Rud Nielsen. 1 Jun 65, 29p
Contract AT (40-1)-1074

Descriptors: (*Halogenated hydrocarbons, Spectroscopy).

UCRL-11927 **Field 7D, 20G**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.
MOLECULAR-BEAM STUDIES OF LANTHANUM MONOXIDE.
Doctoral thesis,
by Robert Michael Walsh. Apr 65, 42p
Contract W-7405-eng-48

Descriptors: (*Lanthanum compounds, Monoxides), (*Molecular beams, Chemical analysis).

UCRL-11979 **Field 7D**
CFSTI Prices: HC$3.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Berkeley.
LOW-LYING ENERGY STATES IN NINE-VALENCE-ELECTRON DIATOMIC MOLECULES.
Doctoral thesis,
by Martin D. Shetlar. 5 Apr 65, 60p
Contract W-7405-eng-48

Descriptors: (*Molecular energy levels, Diatomic molecules), (*Diatomic molecules, Molecular energy levels).

UCRL-14398 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
A THEORETICAL STUDY OF THE SECOND-ORDER RAMAN SPECTRA OF THE CESIUM HALIDES,
by J. R. Hardy, A. M. Karo, and I. W. Morrison. 6 Sep 65, 19p
Contract W-7405-eng-48

Descriptors: (*Raman spectroscopy, Halides), (*Cesium compounds, Halides).

UCRL-16019 **Field 7D**
CFSTI Prices: HC$3.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Berkeley.
THE KINETICS OF THE HIGH-TEMPERATURE-LOW PRESSURE TUNGSTEN-NITROUS OXIDE REACTION.
Doctoral thesis,
by Gerald L. De Poorter. 24 May 65, 56p
Contract W-7405-eng-48

Descriptors: (*Reaction kinetics, Nitrogen compounds), (*Tungsten, Oxides).

UCRL-16093 **Field 7D**
CFSTI Prices: HC$3.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Berkeley.
PHOTOIONIZATION OF ALKALI-METAL VAPORS.
Doctoral thesis,
by Yuan-Tseh Lee. Jun 65, 78p
Contract W-7405-eng-48

Descriptors: (*Ionization, Alkali metals), (*Alkali metals, Vapors).

UCRL-7946 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
DISSOCIATION OF VIBRATIONALLY EXCITED MOLECULAR HYDROGEN IONS ON HYDROGEN GAS,
by E. S. Chambers. 24 Jun 64, 15p
Contract W-7405-eng-48

Descriptors: (*Hydrogen, Excitation), (*Dissociation, Hydrogen).

UCRL-7948 **Field 7C**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
PREPARATION AND STUDY OF A SERIES OF BORANE AND OCTAHYDROTRIBORATE DERIVATIVES OF METHYLATED POLYAMINES,
by F. E. Walker and R. K. Pearson. 2 Jul 64, 11p
Contract W-7405-eng-48

Descriptors: (*Boranes, Preparation), (*Amines, Borates).

8. EARTH SCIENCES AND OCEANOGRAPHY

AD-441 621 **Field 8N**
CFSTI Price: HC$3.00
Lockheed Missiles and Space Co., Sunnyvale, Calif.
THE GEOMAGNETIC FIELD: AN ANNOTATED BIBLIOGRAPHY,
by Eugene E. Graziano and Helen B. McCormick. Aug 63, 64p Rept. nos. 3-56-63-2, SB-63-63
Contract AF04 (647)-787
N64 23882

Descriptors: (*Terrestrial magnetism, Bibliographies), Geophysics, Abstracts, Space environmental conditions.

This bibliography consists of 183 selected references to recent literature on all aspects of the geomagnetic field, and to planetary and interplanetary fields. Actual measurements of magnetospheric phenomena were of particular interest. The time period covered intensively in the literature survey was June 1962 - June 1963, with selective coverage from 1958. The references are arranged alphabetically by personal author, and the bibliography includes a subject index. This search was completed in June 1963. (Author)

AD-465 779 **Field 8A, 8C, 8J**
CFSTI Prices: HC$3.00 MF$0.75
Coast Guard, Washington, D. C. Oceanographic Unit.
OCEANOGRAPHIC CRUISE USCGC NORTHWIND CHUKCHI, EAST SIBERIAN AND LAPTEV SEAS, AUGUST-SEPTEMBER 1963.
Mar 65, 76p Oceanographic-6
USCG 373-6

Descriptors: (*Chukchi Sea, Oceanographic data), (*Oceanology, Arctic regions), (*Arctic regions, Oceanology), Oceanographic equipment, Hydrographic surveying, Seacoast, Siberia.

Identifiers: Laptev Sea, East Siberian Sea, Chukchi Sea.

The oceanographic survey phase of the 1963 Bering Sea Patrol was conducted in the Chukchi, East Siberian and Laptev Seas during the months of August and September. The cruise was designed to study the effect of the discharge of the major river systems along the North Siberian coast. Accomplishments of the cruise included acquisition of comprehensive physical and chemical data as well as execution of geological, bathymetric and biological investigations. A total of 180 serial oceanographic stations were occupied; 11 in the Chukchi Sea, 53 in the East Siberian Sea and 86 in the Laptev Sea. Bathythermograph observations were taken at each of the stations and at appropriate intervals between stations. Bottom samples (gravity corer or orange peel) were also obtained at each of the oceanographic stations as well as at 21 other locations. Over 7,000 miles of echo-sounding track was obtained with an AN/UQN-1C (EDO) fathometer. Much of the 7,000 mile track was in areas of only sketchy hydrographic information.

AD-465 911 **Field 8G**
CFSTI Prices: HC$5.00 MF$1.00
Yale Univ., New Haven, Conn. Dept. of Geology.
POST-MIOCENE STRATIGRAPHY AND MORPHOLOGY, INNER-COASTAL PLAIN, SOUTHEASTERN VIRGINIA.
Doctoral thesis,
by Nicholas Kyros Coch. Jun 65, 184p Technical rept. TR-6
Contract Nonr-609 (40),
Proj. NR-388-064

Descriptors: (*Geology, Virginia), (*Virginia, Geology), Stratigraphy, Terrain, Seacoast, Atlantic Ocean.

This report is part of a detailed study of the Coastal Plain and Continental Shelf of southeastern Virginia. In the study modern laboratory and field techniques as well as a knowledge of recent sedimentary processes and environments have been used in an attempt to interpret the origin and age of the stratigraphic units and associated morphologic features. For the purposes of this study, the Coastal Plain of southeastern Virginia has been divided into a landward, Inner Coastal Plain and a seaward, Outer Coastal Plain. The Inner Coastal Plain, which extends from the Western Branch of the Elizabeth River west to the Fall Line is the subject of this report.

AD-466 615 **Field 8M, 8L**
CFSTI Prices: HC$3.00 MF$0.50
Army Tank Automotive Center, Warren, Mich. Land Locomotion Lab.
DIMENSIONAL ANALYSIS OF LOAD SINKAGE RELATIONSHIPS IN SOILS AND SNOW,

by R. A. Liston and E. Hegedus. Dec 64, 58p LL-100
Projs. DA-1-A-0-137001-A-039, AMCMS-5016.11.84400
ATAC TR-8692

Descriptors: (*Soil mechanics, Trafficability), (*Snow, Trafficability), Soils, Loading (Mechanics), Flat plate models, Measurement, Vehicle tracks.

Principles of dimensional analysis have been applied to load sinkage relationships in various types of soils and snow, in order to evaluate the possibility of predicting the behavior of prototype plates on the basis of load sinkage tests performed with model footings. Encouraging results were obtained in cohesionless soils and in soils possessing little cohesion. A new dimensionally attractive load-sinkage equation has been developed whose accuracy was found to be superior to the Bekker method of load-sinkage evaluation when the work required to produce a certain amount of sinkage served as a basis of comparison. However, the Bekker method produced more accurate results if the measured and computed pressure-sinkage relationships were taken as the basis of comparison. (Author)

AD-467 987 **Field 8E**
CFSTI Prices: HC$2.00 MF$0.50
Naval Weapons Lab., Dahlgren, Va.
ORGANIZATION OF A LARGE-SCALE COMPUTER PROGRAM FOR SPACE AGE GEODESY.
16 Jul 65, 27p NWL-1990

Descriptors: (*Geodesics, Programming (Computers)), (*Programming (Computers), Geodesics), Data processing systems, Astronomical geodesics, Gravity, Mapping.

The GEO-STRETCH program is a large-scale scientific computation which fits observations of artificial earth satellites to produce a detailed picture of the earth's gravitational field and surface geometry. It is run on an IBM STRETCH computer with 48,000 64-bit words of core storage, 10 tape drives and a 2,000,000 word disk store. The large amounts of observational data available and the number of physical parameters to be determined have necessitated novel segmentation procedures for the optimum use of core storage, and required the development of a fully automatic library procedure. In addition, the large number of operating modes required in the practical use of the program has led to a unique blend of scientific programming, software interpretive programs and large-scale data processing, which tax the capacity of the STRETCH computer to its practical limit. This paper describes the problems encountered in the program and the devices used to surmount them. (Author)

BNWL-SA-135 **Field 8G**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PROBLEMS ASSOCIATED WITH THE EXTENSION OF THE STRATIGRAPHIC UNITS OF SOUTH-CENTRAL WASHINGTON. PART I. THE LATE BASALT FLOWS, ELLENSBURG AND LOWER RINGOLD FORMATIONS,
by R. E. Brown and D. J. Brown. 5 Apr 65, 11p
CONF-650432-3
Contract AT (45-1)-1830
Presented at General Conference of Pacific-Northwest Trade Assn., (53rd) Portland, Ore.

Descriptors: (*Stratigraphy, Structural geology), (*Structural gology, Stratigraphy).

BNWL-SA-140 **Field 8G**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PROBLEMS ASSOCIATED WITH THE EXTENSION OF THE STRATIGRAPHIC UNITS OF SOUTH-CENTRAL WASHINGTON. PART II. THE POST BASALT SEDIMENTS,
by D. J. Brown and R. E. Brown. 26 Mar 65, 9p
CONF-650432-2
Contract AT (45-1)-1830
Presented at General Conference of Pacific-Northwest Trade Assn., (53rd), Portland, Ore.

Descriptors: (*Stratigraphy, Structural geology), (*Structural geology, Sedimentary rock).

CU-2663-13 **Field 8C**
CFSTI Prices: HC$1.00 MF$0.50
Lamont Geological Observatory, Palisades, N.Y.
ON A POSSIBILITY OF SIMPLIFIED MEASUREMENT OF TURBULENT DIFFUSION NEAR THE OCEAN BOTTOM,
by Takashi Ichiya. Dec 64, 17p CU-1-64, CU-13-64
Contract AT (30-1)-2663, Grant NSF-GP-1806

Descriptors: (*Turbulence, Measurement), (*Ocean bottom, Turbulence).

CU-2663-14 **Field 8C**
CFSTI Prices: HC$2.00 MF$0.50
Lamont Geological Observatory, Palisades, N.Y.
CARIBBEAN CURRENT MEASUREMENTS, JULY 1964.
Technical rept.,
by Robert Gerard. Dec 64, 44p CU-14-64
Contract AT (30-1)-2663

Descriptors: (*Ocean currents, Measurement), (*Carribean Sea, Ocean currents).

CU-2663-16 **Field 8C**
CFSTI Prices: HC$2.00 MF$0.50
Lamont Geological Observatory, Palisades, N.Y.
SOME HYDRODYNAMIC PROBLEMS FOR A NEPHELOID ZONE.
Technical rept.,
by Takashi Ichiye. Dec 64, 28p CU-16-64, CU-2-64
Contracts AT (30-1)-2663, Nonr-266 (48)

Descriptors: (*Ocean currents, Ocean bottom), (*Hydrodynamics, Ocean currents).

CU-2663-17 **Field 8C**
CFSTI Prices: HC$2.00 MF$0.50
Lament Geological Observatory, Palisades, N. Y.
MIXING AND RESIDENCE TIME ON THE GREAT BAHAMA BANK.
Technical rept.,
by J. Michael Costin. Jan 65, 30p CU-17-65
Contract AT (30-1)-2663

Descriptors: (*Ocean currents, Bahama Islands), (*Turbulence, Ocean currents).

HW-SA-3511 **Field 8M, 6A, 6C**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
THE INFLUENCE OF GREASEWOOD ON SOIL MOISTURE PENETRATION AND SOIL CHEMISTRY,
by W. H. Rickard. 30 Apr 64, 11p
Contract AT (45-1)-1350

Descriptors: (*Plants (Botany), Soil mechanics), (*Soil mechanics, Plants (Botany)).

NYO-10361 **Field 8G, 18J**
CFSTI Prices: HC$3.00 MF$0.50
Pennsylvania State Univ., University Park. Mineral Industries Experiment Station.
AN INVESTIGATION OF THE MINERALOGY, PETROGRAPHY, AND PALEOBOTANY OF URANIUM-BEARING LIGNITIES.
Final research rept.,
by T. F. Bates and W. Spackman. 1 May 65, 52p
Contract AT (30-1)-2000

Descriptors: (*Geology, Uranium), (*Uranium, Geology).

NYO-10508 **Field 8H, 18I**
CFSTI Prices: HC$2.00 MF$0.50
Chesapeake Bay Inst., Johns Hopkins Univ., Annapolis, Md.
ON THE PREDICTION OF THE DISTRIBUTION OF EXCESS TEMPERATURE FROM A HEATED DISCHARGE IN AN ESTUARY.
Technical rept. no. 33, Reference 65-1,
by D. W. Pritchard and H. H. Carter. Feb 65, 49p Reference-65-1
Contract AT (30-1)-3109

Descriptors: (*Estuaries, Thermal conductivity), (*Nuclear power plants, Reactor coolants).

NYO-8925 **Field 8G, 7E**
CFSTI Prices: HC$4.00 MF$0.75
Carnegie Inst. of Tech., Pittsburgh, Pa. Dept. of Chemistry.
DATING OF MARINE SEDIMENTS BY IONIUM AND PROTACTINIUM METHODS.
Doctoral thesis,
by Tadepalli P. Sarma. 1 Jun 64, 117p
Contract AT (30-1)-844
Submitted to Carnegie Inst. of Tech., Pittsburgh.

Descriptors: (*Geologic age determination, Radiochemistry), (*Sedimentation, Geologic age determination).

PB-169 073 **Field 8D, 7B**
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Dept. of Geology and Geophysics.
DETERMINATION OF POTASSIUM IN SILICATE MINERALS AND ROCKS BY NEUTRON ACTIVATION ANALYSIS,
by John W. Winchester. 3 Nov 60, 38p
Grant NSF-G6066

Descriptors: (*Petrology, Neutron activation analysis), (*Potassium, Silicates), (*Rocks (Geology), Potassium), Geochemistry, Geological age determination, Minerals, Beta particles, Test methods, Chemical analysis.

A procedure is described for the determination of potassium in natural silicate minerals by pile neutron activation and counting the induced beta radiation in the irradiated specimen without chemical processing. An end-window proportional counter and Al absorbers are used for radioactivity measurement. Precision and absolute accuracy of the method are of the order of 1%, and interference by trace elements in general is less than this. Results are presented for the analysis of the standard granite G-1, diabase W-1, argillaceous limestone NBS No. 1a, feldspar NBS No. 70, and biotite M.I.T. No. B3203. (Author)

PB-169 112 **Field 8M, 13B**
CFSTI Prices: HC$6.00 MF$1.25
Louisiana State Univ., Baton Rouge. Div. of Engineering Research.
THE EFFECT OF ADMIXTURES ON LAYERED SYSTEMS CONSTRUCTED WITH SOIL-CEMENT,
by Terry J. Dantin and Ara Arman. 1965, 215p
Engineering-Research-bull-86
Proj. La-736-00-31

Descriptors: (*Soil mechanics, Stabilization systems), (*Civil engineering, Soil mechanics), (*Pavements, Soil mechanics), (*Laminates, Pavements), Additives, Soils, Cements, Mixtures, Bonding, Roads, Compressive properties, Binders, Carboxylic acid, Calcium compounds, Sulfonates.

Identifiers: Calcium lignosulfonates.

The study investigates the effect of dispersant additives on the physical characteristics of soil-cement mixes and layered pavement systems. These additives are industrial by-products which can impact special characteristics to concrete and masonry. They have been used successfully for over twenty-five years in improving structural concrete by reducing cracking and increasing shear strength. Their function is to control the rate of cement hydration by retarding the setting and reducing the thickness of the cement gel. Commercially available are: Hydroxylated Carboxylic Acid and Calcium Lignosulfonate. The effects of these admixtures are presented in three major areas: (1) Increases in the shear strength of individual layers; (2) increases in the durability; and (3) production of bond at the interface which considerably increases the shear strength of the layered system. (Author)

PB-169 127 **Field 8K, 17J**
CFSTI Prices: HC$2.00 MF$0.50
Geotech Div., Teledyne Industries, Inc., Garland, Tex.
SEISMOLOGICAL BULLETIN: THE ALEUTIAN ISLAND EXPERIMENT, 1964.
7 Dec 65, 46p Technical rept. TR-65-130
Contract AF33 (657)-12145,
Projs. VELA-UNIFORM, AFTAC-VT/4051

Descriptors: (*Seismology, Aleutian Islands), (*Aleutian Islands, Seismology), Periodicals, Seismological stations, Instrumentation, Earthquakes, Explosions, Seismic waves, Propagation, Tables, Calibration.

Identifiers: Vela-Uniform.

This bulletin contains seismological data derived from earthquakes and network calibration explosions recorded at six mobile seismological stations and two deep-ocean seismographs. The explosions were detonated to provide time-field calibration for study of earthquakes occurring in the vicinity of the network. Pertinent source parameters for the calibration explosions are given in tabular form. Positions of calibration explosions are also plotted.

PB-169 129 **Field 8D, 8G**
CFSTI Prices: HC$2.00 MF$0.50
Hawaii Univ., Honolulu. Dept. of Chemistry.
OXIDATION-REDUCTION SYSTEMS OF IGNEOUS ROCKS AND THEIR RELATIONSHIP TO GASEOUS VOLATILE COMPOSITION.
Final rept.,
by John J. Naughton. 1963. 49p
Grant NSF-G6068
Also includes: Chemistry of Volcanic Gases; I. Collection and Analysis of Equilibrium Mixtures by Gas Chromatography. II. Use of Equilibrium Calculations in the Interpretation of Volcanic Gas Samples, by Emerson F. Heald, John J. Naughton and Lynus Barnes, Jr.

Descriptors: (*Geochemistry, Volcanoes), (*Volcanoes, Gas analysis), Oxidation-reduction reactions, Gases, Igneous rock, Chromatographic analysis, Chemical equilibrium.

PB-169 130 **Field 8G, 6C**
CFSTI Prices: HC$2.00 MF$0.50
Oklahoma Univ. Research Inst., Norman.
STRATIGRAPHIC PALYNOLOGY.
Final rept.,
by L. R. Wilson. 31 Jan 62. 26p
Grant NSF-G-6589

Descriptors: (*Paleontology, Pollen), (*Pollen, Paleontology), (*Stratigraphy, Paleontology), (*Spores, Paleontology), Plants (Botany), Ecology, Oklahoma, Sedimentary rock.

Identifiers: Palynology.

An investigation of the palynological fossils in the sedimentary rocks of Oklahoma and adjacent region to determine their morphologic types, stratigraphic ranges, paleogeography, and paleoecology. The results to be compared with like studies in other parts of the world. (Author)

PB-169 156 **Field 8H, 2C**
CFSTI Prices: HC$3.00 MF$0.75
Bureau of Reclamation, Denver, Colo.
FIELD TESTS OF SODIUM CARBONATE AS A SEALANT TO REDUCE SEEPAGE FROM CANALS,
by Mansil W. Scrivner. Sep 65. 73p Technical memo. TM-665

Descriptors: (*Irrigation systems, Sealing compounds), (*Sealing compounds, Irrigation systems), Sodium compounds, Carbonates, Costs, Test methods, Experimental data.

Identifiers: Sodium carbonate.

Two reaches of operating irrigation canals treated with sodium carbonate showed the chemical to be effective in reducing seepage immediately after application, but much of the sealing capacity was lost in one season. After conducting extensive tests on 74 inorganic chemicals, the Bureau of Mines chose sodium carbonate as the most favorable sealant considering cost and effectiveness. USBR decided to field-test sodium carbonate on existing canals in uniform permeable soils containing sufficient clay to react with the chemical. Culbertson Extension Canal, Frenchman-Cambridge Division, and Walter's Lateral, Tucumcari Project, were selected after soil tests. The chemical was sprayed on the test reaches in 22% solutions using existing project equipment. This application method was practical, costing $0.05/sq yd for materials and labor. Initial reduction at design depth on Culbertson reach was about 60% from about 0.44 cu ft/sq ft/day (cfd) to about 0.17 in Pond 2 and 0.38 to 0.16 in Pond 3. Initial reduction in Pond B of Walter's Lateral at design depth was about 50% from 1.98 to 0.95 cfd. Tests at the end of the first season on Culbertson reach indicate that some sealing was still present. Additional tests in 1965 will evaluate residual sealing effects. All initial sealing on Walter's Lateral was apparently lost during the first season. Initial post-treatment ponding tests indicated some loss of effectiveness even before lateral was placed in service. (Author)

PB-169 174 **Field 8M, 1E**
CFSTI Prices: HC$3.00 MF$0.50
Air Force Cambridge Research Center, Bedford, Mass. Geophysics Research Directorate.
REMOTE DETERMINATION OF SOIL TRAFFICABILITY BY THE AERIAL PENETROMETER.
Surveys in Geophysics,
by Carlton E. Molineux. Oct 55. 51p AFCRC-SIG-77
AFCRC TN-55-223,
AD 92 254

Descriptors: (*Trafficability, Aerial reconnaissance), (*Aerial reconnaissance, Trafficability), (*Soil mechanics, Instrumentation), (*Landing fields, Site selection), Soils, Drop testing, Spikes, Penetration.

Identifiers: Aerial penetrometers.

Basic soil trafficability concepts and soil properties are described, together with standard engineering methods for determining trafficability, including the manual cone penetrometer. The aerial penetrometer for trafficability determination from aircraft is described in detail, with procedures for use, limitations and safety factors given. Information on soil strength requirements for various combinations of aircraft loads and tire pressures is given, with conversion factors for aerial penetrometer use of standard vehicle mobility engineering data. Other applications of the aerial penetrometer for investigation of trafficability of snow and ice covered surfaces are outlined. (Author)

PB-169 183 **Field 8A**
CFSTI Prices: HC$5.00 MF$1.00
Florida State Univ., Tallahassee. Sedimentology Research Lab.
THE DISTRIBUTION OF PLANKTONIC FORAMINIFERA IN DEEP-SEA CORES FROM THE SOUTHERN OCEAN, ANTARCTICA.
Master's thesis,
by Donald G. Blair. Dec 65. 152p

Descriptors: (*Marine biology, Antarctic Regions), (*Foraminifera, Antarctic Regions), (*Antarctic Regions, Foraminifera), Plankton, Ocean bottom sampling, Ecology.

Identifiers: Drake Passage, Southern Ocean.

The tops of 76 piston and trigger weight cores from the Drake Passage and South Pacific sectors of the Southern Ocean were examined to determine the areal distribution of planktonic Foraminifera. Nine species were found in surface sediments and one additional species was found in subsurface layers. The Antarctic fauna is composed of a single species, Globigerina pachyderma, which is predominant south of the Antarctic convergence. Randomly distributed in sediments on both sides of the convergence are G. quinqueloba, Globigerinita glutinata, and G. uvula, which comprise a mixed or transition fauna. The temperate species Globigerina bulloides, Globorotalia inflata, G. truncatulinoides, G. scitula, and G. crassaformis increase markedly in abundance northward from the convergence and characterize the Subantarctic fauna. Orbulina universa was observed in subsurface layers only. The data suggest that the areal distribution of planktonic Foraminifera is controlled in a large measure by the mean position of the convergence. Where the convergence is poorly developed or otherwise modified by water masses such as the Falkland Current, the correlation is not as definite. (Author)

PB-169 200 **Field 8K, 17J**
CFSTI Prices: HC$1.00 MF$0.50
Coast and Geodetic Survey, Washington, D. C.
COMPARISON OF EARTHQUAKES AND EXPLOSIONS,
by D. S. Carder and G. W. Gordon. Aug 62 16p
Presented at the Meeting of the AFOSR Advisory Committee for Geophysics (5th), 5 Jun 62.

Descriptors: (*Seismology, Detection), (*Nuclear explosions, Seismology), (*Earthquakes, Identification), Underground explosions, Seismic waves, Seismographs, Graphics, Analysis.

Working hypotheses for differentiating between the seismic records of earthquakes and underground explosions.

PNE-810F **Field 8G, 18C**
CFSTI Prices: HC$2.00 MF$0.50
Geological Survey, Denver, Colo.
GEOLOGY AND SURFACE EFFECTS, HANDCAR EVENT,
by R. E. Davis, W. J. Carr and J. P. Dagostine.
Aug 65. 29p
Contract 1105-4227-61

Descriptors: (*Structural geology, Nuclear explosion damage).

SC-RR-65-478 **Field 8G, 18C**
CFSTI Prices: HC$2.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
CRATERS FROM A SINGLE ROW OF CHARGES BURIED BENEATH THE CRATERS FROM PARALLEL ROWS OF CHARGES,
by L. J. Vertman. Oct 65. 33p
Contract AT (29-1)-789

Descriptors: (*Cratering, Experimental data).

9. ELECTRONICS AND ELECTRICAL ENGINEERING

AD-407 606 **Field 9A, 13H**
CFSTI Price: HC$2.00
General Electric Co., Syracuse, N. Y. Materials and Processes Lab.

SOLDERABILITY OF PRINTED CIRCUITS.
Quarterly progress rept. no. 2, 1 Jan-31 Mar 63, by Joel Fabish. 31 Mar 63, 38p Rept. no. 2
Contract DA-36-039-AMC-00008,
Task 703

Descriptors: (*Printed circuits, Soldering), (*Soldering, Printed circuits), Soldering fluxes, Soldering alloys, Test methods, Aging (Materials), Test equipment, Tests.

The objective of this project is to develop test methods for the solderability testing of printed circuit boards to be used in dip and flow solder operations and to compile sufficient test data to enable the test method to be used under a variety of conditions. This quarterly report discusses the redesign of the solderability test fixture and the development of a standard test pattern. Also covered are test results from natural and artificial aging of boards. A test technique has been developed in detail for dip solderability testing. (Author)

AD-418 347 **Field 9A, 20C**
CFSTI Price: HC$2.00
Westinghouse Research Labs., Pittsburgh, Pa.
RESEARCH ON HIGH GAIN TRANSMISSION SECONDARY EMISSION FILMS.
Progress rept. no. 6, 1 Apr-1 Jul 63,
by M. Green. 13 Aug 63, 31p
Contract DA-44-009-eng-4858

Descriptors: (*Photoelectric effect, Films), (*Image intensifiers (Electronics), Photoelectric effect), (*Electrodes, Secondary emission), (*Secondary emission, Films), (*Films, Secondary emission), Electron tube parts, Potassium compounds, Chlorides, Resolution, Electric fields.

Identifiers: Dynodes, Grids (Electron tube), Potassium chloride.

A general study of the resolution attainable with low density dynodes was iniated. Both theoretical and practical work was undertaken. The limiting resolution of an image section containing a KCl dynode and control grid was studied during the experimental investigation, and a dynode - grid spacing of 0.25 inches was used to avoid the fringing field problems described above. The importance of the electric field strength at the dynode exit surface was clearly demonstrated along with the beneficial effects on resolution of increasing the maximum field that a dynode can sustain.

AD-443 951 **Field 9A**
CFSTI Price: HC$4.00
Clevite Corp., Cleveland, Ohio. Electronic Research Div.
FERROELECTRIC CERAMIC FILTERS, IF TRANSFORMERS AND NETWORKS.
Rept. no. 29 (Final), 1 Dec 61-29 Feb 64,
by D. R. Curran, W. J. Gerber, D. J. Koneval, andA. D. Waren. 27 Apr 64, 141p
Contract DA-36-039-sc-87275 (E),
Proj. DA-302410,
Task DA-1G6-22001-A-057-05

Descriptors: (*Crystal filters, Ceramic materials), (*Transformers, Intermediate frequency), Quartz resonators, Piezoelectric crystals, Attenuation, Chemical milling, Vapor plating, Metal films, Silver, Gold, Aluminum, Chromium, Packaging, Band-pass filters, Equations, Programming (Computers), Mathematical prediction, Medium frequency, Circuits.

The feasibility of applying ceramic Uni-Wafer techniques to quartz was demonstrated, yielding quartz Uni-Wafer filters and networks. The behavior of high frequency quartz resonators has been explained in terms of elastic wave theory and a cut-off phenomenon, where the cut-off frequency for lateral propagation in the wafer is given by its plane wave thickness shear resonance. Because of electrode mass-loading, each resonator area has its resonant frequency below this cut-off frequency and therefore is in effect a trapped energy mode. Vibratory energy excited in the resonator cannot propagate away and therefore is restricted to the electroded region as a standing wave with only an exponentially attenuated fringe extending beyond the electrode. The exponential attenuation in the region beyond the electrode has been confirmed by measurements of mechanical coupling between pairs of resonators and between a resonator and an absorbing edge of the wafer. The predicted standing waves within the electrode region offer a plausible explanation for inharmonic overtone modes observed in high frequency AT-cut quartz resonators, and suggest a design criterion relating electrode dimension with electrode mass loading.

AD-450 661 **Field 9B, 19E**
CFSTI Prices: HC$1.00
Army Missile Command, Redstone Arsenal, Ala. Electromagnetics Lab.
A DIGITAL SQUARE-ROOT COMPUTER,
by Gerald W. Price. 17 Sep 64, 20p Rept. no. RE-TR-64-19
Proj. DA-IR-242 1040226

Descriptors: (*Digital computers, Design), Special purpose computers, Binary arithmetic, Distortion, Boresighting, Target discrimination, Computer logic.

It is proposed in this report to build a square-root digital computer for a hard-wired special-purpose airborne application where speed and simplicity are prime in importance; to use compatible computing methods presently in use in the Optical Discrimination System; and to use the special algorithm techniques. Complete mechanization and detailed design schematics are included, along with test results of a complete working model. (Author)

AD-451 638 **Field 9A, 9E**
CFSTI Price: HC$3.00
Naval Ordnance Lab., White Oak, Md.
DESIGN STUDY OF A TRANSISTOR CRYSTAL OSCILLATOR USING A VOLTAGE-VARIABLE CAPACITOR FOR FREQUENCY MODULATION,
by Charles A. Fisher. 5 Aug 64, 61p NOLTR-64-147
Task WEPTASK RUDC-2B-000/212-1/F001-13-07

Descriptors: (*Crystal oscillators, Transistors), (*Transistors, Crystal oscillators), Tuned circuits, Voltage, Frequency modulation, Very high frequency, High frequency, Modulators, Radio transmitters, Coils, Silicon, Varactor diodes, Equations, Sensitivity, Phase shift, Stability, Radio sono buoys, Bandwidth, Mechanical drawings.

The paper presents a design study of a variablefrequency crystal oscillator and reactance modulator for use at 20 to 22 Mc in a VHF transmitter. The oscillator is essentially the transistor equivalent of the Pierce vacuum tube oscillator; however, several unusual design features are involved. In particular, a coil is used in series with the crystal in accordance with the design criteria developed here to allow stable operation over a much wider band of frequencies than is possible with an ordinary crystal oscillator. Also, the design has the output taken from a tank tuned to the second harmonic of the oscillator frequency to minimize frequency-multiplying stages. The reactance modulator employs two silicon voltage-variable capacitors connected across one capacitive branch of the oscillator. This arrangement allows the oscillator frequency to be directly deviated by an audio signal voltage. (Author)

AD-459 610 **Field 9E**
CFSTI Price: HC$3.00
Radio Corp. of America, Lancaster, Pa. Power Tube Operations.
RESEARCH AND DEVELOPMENT OF A PHASEDARRAY MODULE.
Rept. no. 5 (Final) 1 Jul 63-25 Feb 65,
by F. W. Peterson and R. L. Bailey. 25 Feb 65, 87p
Contract DA-36-039-AMC-03203 (E),
Task DA-1G-22001-A-055-02

Descriptors: (*Antenna arrays, Modules (Electronic)), (*Modules (Electronic), Antenna arrays), Triodes, Tetrodes, Amplifiers, Broadband, Circuits, Costs, L-band, Electrical impedance, Power amplifiers, Radiofrequency power, Performance (Engineering).

This program entailed the design and development of a broadband amplifier module in which triodes and tetrodes are employed to generate 5 kw of peak power output over a 10 percent frequency spectrum (to the 1 -db points) centered at 1300 mc, with a gain of up to 51 db. The program of technical work culminated in the successful fabrication and testing of two such modules. Four Quarterly Reports described in detail the progress made during each phase of the program. This Final Report, which covers the period of the entire contract, summarizes methods of approach to the solution of various problems encountered. Photographs, charts, and schematic diagrams provide a comprehensive physical description of the modules and present complete performance data. Overall conclusions are derived from the work done throughout the period of the contract, and from the performance of the modules. Recommendations are made concerning areas of further work and investigation. (Author)

AD-464 486 **Field 9A, 13H**
CFSTI Price: HC$1.00
Mitre Corp., Bedford, Mass.
FABRICATION OF GLASS MASKS, AND THEIR APPLICATION TO THIN-FILM CIRCUIT DEPOSITION,
by Patrick Everett and Richard Roderick. May 65, 25p W-06760
Contract AF19 (628)-2390,
Proj. AF-508
ESD TDR-64-634

Descriptors: (*Templates, Glass), (*Films, Circuits), (*Glass, Etching), Manufacturing methods, Printed circuits, Inorganic acids, Fluorides, Resistors, Integrated circuits, Semiconducting films, Microminiaturization (Electronics).

The report describes a process which has been developed for the etching of glass masks. A discussion of the requirements for these masks in thin-film circuit deposition precedes a detailed description of the process. Six masks were produced by the process, and measurements were made to determine the tolerances obtained. (Author)

AD-465 782 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Signetics Corp., Sunnyvale, Calif.
ECONOMICAL FLAT PACKAGE FOR INTEGRATED CIRCUITS.
Quarterly rept. no. 4, 15 Mar-15 Jun 65. 17 Jun 65, 16p
Contract NObsr-91298,
Proj. SR0080303,
Task 9631

Descriptors: (*Integrated circuits, Packaging), (*Packaging, Integrated circuits), Bonding, Ultrasonic radiation,Manufacturing methods, Costs, Processing.

The ultrasonic bonding method was extensively re-evaluated after observing in process bond failures. Corrective measures have been instituted and improvement is seen on initial testing.

AD-465 867 **Field 9E**
CFSTI Prices: HC$3.00 MF$0.75
Transducer Information Center, Battelle Memorial Inst., Columbus, Ohio.
A SUMMARY OF DIGITAL-TRANSDUCER DEVELOPMENTS AND TECHNIQUES,
by W. E. Chapin. 15 Jul 65, 100p TIC Summary-1
Contract AF33 (615)-1819

Descriptors: (*Transducers, Digital systems), Analog systems, Interference, Optical properties, Frequency modulation, Optical equipment, Lasers, Flowmeters, Coding, Op-

210-195 O - 66 - 18

tical scanning, Recording systems, Electromagnetic properties, Telemeter systems.

Identifiers: Binary coding, Moire patterns, Sensors (Instrumentation).

A brief review of the definitions of digital and analog transducers provides a background terminology for a discussion on the advantages and disadvantages of each type. Semi- and true digital transducers are tentatively defined in terms of time and space domains. A variety of digitizing and coding techniques are discussed prior to summarizing some significant digital-transducer research results. Manufacturers' information on currently available digital transducers is discussed. (Author)

AD-466 313 **Field 9B, 5B**
CFSTI Prices: HC$4.00 MF$1.00
Computer Command and Control Co., Washington, D. C.
ASSOCIATIVE MEMORY COMPUTER SYSTEM; DESCRIPTION AND SELECTED NAVAL APPLICATIONS.
Final rept.
10 Apr 65, 141p Rept. no. 25-101-11
Contract Nonr-4068 (00)

Descriptors: (*Special purpose computers, Information retrieval), (*Information retrieval, Special purpose computers), Feasibility studies, Design, Bubble chambers, Weapons, Command ; control systems, Pattern recognition, Thin films (Storage devices), Computer logic, Circuits, Naval research, Navy, Programming (Computers), Computer storage devices, Magnetic core storage.

Identifiers: Associative retrieval.

Summarized briefly are three specific applications comparing the utility of a Hardware Associative Memory (HAM) versus a logically equivalent but slower multilist technique usable on any computer. The applications were (1) pattern recognition for bubble chamber pictures (2) maintaining a Sea Surveillance file as part of a large data system and (3) weapon assignment similar to that used in the Naval Tactical Data System. The report also describes in considerable detail an associative memory integrated into the design of an otherwise conventional computer. Order codes, block diagrams, etc., are given. A thin film memory is postulated both for the associative memory itself (HAM) and also for other uses. The feasibility and estimated costs of plated wires for this film memory have been investigated. The use of an associative memory by an executive routine is very promising, e.g., an order of magnitude improvement in mass storage throughput. Several fast memories currently under development have a Non-Destructive Read Out mode (NDRO); such memories can be given inexpensive associative functions for the programmer to use optionally. (Author)

AD-466 445 **Field 9B, 12A**
CFSTI Prices: HC$2.00 MF$0.50
Michigan Univ., Ann Arbor. Dept. of Communication Sciences.
TRANSPARENT CATEGORIES AND CATEGORIES OF TRANSITION SYSTEMS.
Technical rept.,
by Yehoshafat Give'on. May 65, 41p Rept. no. 03105-38-T
Contract Nonr-1224 (21),
Proj. ORA-03105

Descriptors: (*Automata, Theory), Algebras, Monoids, Computer logic, Set theory, Mapping (Transformations), Algebraic topology, Operators (Mathematics).

Several recent results in automata theory give evidence of the importance of homomorphisms in the study of transition systems and automata. It is natural therefore to inquire how much information can be retrieved from the algebra of homomorphism compositions with respect to transition systems. The natural mathematical framework for the discussion of this problem is categorical algebra. A category AW of the transition systems with input W is defined; W is any arbitrary fixed monoid, and with arbitrary sets of states. In this paper it is shown that AW has a generator, MW (which is W operating on itself as a transition system) and that exists a functor naturally equivalent to the identity functor of AW. A general exposition of the nature of properties which are retrievable from the 'morphism-behavior' in an arbitrary category is presented so that it provides a rigorous general basis for studying 'retrievable' properties and categories in which every structural property of objects and morphisms is 'retrievable.' It is proved that for a very broad class of input monoids, which includes all the types of inputmonoids encountered in automata theory, the categories AW are transparent. That is, anything which can be said about the structure of transition systems with input W, can be said by referring to their homomorphisms only. (Author)

AD-466 540 **Field 9A**
CFSTI Prices: HC$2.00 MF$0.50
Loral Electronic Systems, New York.
DEVELOPMENT OF ELECTRONICALLY TUNED YIG AMPLIFIER.
Final rept., 1 Nov 64-26 Apr 65,
by Morris Cohen. Jun 65, 29p
Contract AF33 (615)-2143
AFAL TR-65-138

Descriptors: (*Microwave amplifiers, X band), Design, Tunnel diodes, Modules (Electronics), Tuned amplifiers, Cascade structures, Yttrium compounds, Iron compounds, Garnet, Ferromagnetic materials.

A novel design technique utilizing two nonreciprocal directional YIG filters and two tunnel diode amplifier modules was employed to realize a compact electronically tunable amplifier operable in the X-band region. The dual nonreciprocal filter structures are tuned by a single electromagnet and function as both the tuning and circula-tor mechanism. This report relates the overall system approach, design technique and measured performance data. (Author)

AD-466 698 **Field 9E**
CFSTI Prices: HC$1.00 MF$0.50
Adams- Russell Co., Inc., Waltham, Mass.
QRC-158-13 (T) ANTENNA SYSTEM.
Monthly technical progress rept. no. 3, 9 Mar-20 Jul 65,
by John Kelly. 20 Jul 65, 3p
Contract AF33 (657)-13618

Descriptors: (*Radar antennas, Research program administration), Design, Radar jamming, Radoms, Voltage, Standing wave ratios.

Identifiers: QRC-158

AD-466 849 **Field 9A, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Sprague Electric Co., North Adams, Mass.
PRODUCTION ENGINEERING MEASURE FOR MECHANIZATION OF HIGH-RELIABILITY CAPACITORS.
Quarterly rept. no. 9, 30 Dec 64-30 Mar 65,
by J. H. D. Folster, P. M. Kennedy and G. E. Walters. 30 Mar 65, 24p
Contract DA-36-039-AMC-01460 (E)

Descriptors: (*Capacitors, Production), (*Paper capacitors, Manufacturing methods), Electronic equipment, Reliability (Electronics), Quality control, Industrial equipment, Design.

Work on the production design engineering and design of pilot line equipment continues. Of the 29 major subassemblies to be used in the mechanized high-reliability capacitor assembly operation, 14 are complete, and another 14 are in various stages of production. The remaining mechanism is being designed. In addition to the progress report, this document also contains a brief description of the assembly sequence and of the function of each subassembly in the mechanized operation. This description incorporates changes and additions made since the description provided in the Fifth Quarterly Report. (Author)

AD-467 986 **Field 9C, 17G**
CFSTI Prices: HC$3.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Instrumentation Lab.
A METHOD FOR ELECTROSTATIC POWER TRANSFER OF WHEEL-MOTOR POWER THROUGH GYROSCOPE DAMPING FLUID,
by Howard Musoff. Mar 65, 61p E-1753
Contracts AF33 (657)-7668, AF33 (615)-2243,
Projs. DSR-52-192, DSR-52-231
N65 34257

Descriptors: (*Gyroscopes, Power supplies), (*Electric motors, Gyroscopes), Distribution, Power, Electrostatic fields, Radiofrequency, Electrical conductance, Amplitude modulation, Demodulation, Fluids, Damping, Electric bridges, Diodes (Semiconductor).

A method is described whereby two half-cycle cosine-modulated radio-frequency carrier waves are used to transfer gyroscope wheel-motor power through the gyroscope damping fluid. This half-cycle modulation method is compared with both full-cycle amplitude modulation and suppressed-carrier modulation methods for transferring power. Also presented are efficiency measurements obtained from a breadboard demodulator using the half-cycle modulation method. (Author)

ANL-7050 **Field 9B, 20H, 18F, 18I,2**
CFSTI Prices: HC$6.00 MF$2.50
Argonne National Lab., Ill.
PROCEEDINGS OF THE CONFERENCE ON THE APPLICATION OF COMPUTING METHODS TO REACTOR PROBLEMS, MAY 17-19, 1965.
Aug 65, 572p CONF-650501
Contract W-31-109-eng-38

Descriptors: (*Nuclear reactors, Numerical methods ; procedures), (*Computers, Nuclear reactors).

ANL-7054 **Field 9B**
CFSTI Prices: HC$5.00 MF$1.00
Argonne National Lab., Ill.
COLLECTED ALGORITHMS 1900-1963 FROM THE COMMUNICATIONS OF THE ASSOCIATION FOR COMPUTING MACHINERY,
by R. E. Grench and H. C. Thacher, Jr. Jul 65, 165p
Contract W-31-109-eng-38

Descriptors: (*Algorithms, Programming (Computers)).

BDX-613-59 **Field 9E**
CFSTI Prices: HC$5.00 MF$1.00
Kansas Univ., Lawrence.
THE AUTOMATIC BIAS AND FLUX-RESET OF A MAGNETIC MODULATOR.
Master's thesis,
by Jim L. Taylor. May 64, 153p
Contract AT (29-1)-613
Submitted to University of Kansas.

Descriptors: (*Magnetic modulators, Design).

BDX-613-64 **Field 9B**
CFSTI Prices: HC$3.00 MF$0.75
New Mexico State Univ., University Park.
THE ANALYSIS OF AN INPUT BUFFER FOR REMOTE CONTROL OF LOGIC CIRCUITS.
Master's thesis,
by Herbert G. Thorpe. Dec 64, 64p
Contract AT (29-1)-613
Submitted to the University of Kansas.

Descriptors: (*Computer logic, Remote control systems), (*Remote control systems, Computer logic).

C13.46-266 **Field 9C, 14B**
CFSTI Price:MF$0.50
National Bureau of Standards, Washington, D.C. Inst. for Basic Standards.
VOLTAGE RATIO DETECTOR FOR MILLIVOLT SIGNALS,
by J. R. Houghton. 13 Dec 65, 14p
NBS TN-266
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.15.

Descriptors: (*Voltmeters, Comparators), (*Transducers, Calibration), Vibration, Measuring devices (Electrical + electronic), Voltage dividers Test methods.

A voltage ratio detector circuit for measuring ratios of a-c and d-c signals 5 millivolts or larger is described. The ratio is determined with a precision voltage divider which is accurate to within 0.001 percent of the indicated ratio when the ratio is near one. The detector has sufficient sensitivity and stability to indicate differences between two signals of 0.01 percent. Experimental results are presented to show the relative improvement in sensitivity of this voltage ratio detector over the previously used transfer admittance method for the calibration of vibration pickups. (Author)

C13.46-281 **Field 9B, 5G, 6E**
CFSTI Price: MF$0.75
National Bureau of Standards, Washington, D.C.
MATERIALS FOR PLACEBO V,
by William C. Watt. 17 Jan 66, 96p Technical note TN-281
Hardcopy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.50. See also PB-169 177, AD-614 258.

Descriptors: (*Context free grammars, Medical research), Nervous system, Pathology, Brain, Tissues (Biology), Pictures, Man-machine systems, Data processing systems, Computers, Analysis.

Identifiers: Placebo context-free grammar, Itself computer discourse.

Materials are presented that make the microgrammar Placebo V accessible to inspection. Placebo V should result in a working component of the Itself system which is to enable neuropathologists to use a computer as an ally in the analysis of pictures of brain tissue and of sets of such pictures. The final Placebo will allow its users to describe such pictures (or 'sections') in English sentences, to query the computer in English, and to issue instructions in English for picture processing. The computer will respond in English. Section I of this paper opens with a key to the format in which the microgrammars are written and proceeds to listings of the rules of Placebos IV and V. Section 2 discusses inclusion problems between context-free machine grammars. Section 3 lists sentences generated from Placebo V rules.

CEX-59.4 **Field 9B, 18D**
CFSTI Prices: HC$1.00 MF$0.75
Edgerton, Germeshausen and Grier, Inc., Santa Barbara, Calif.
AERIAL RADIOLOGICAL MONITORING SYSTEM. PART III. ELECTRONIC PROCESSING OF ARMS-II DATA,
by J. E. Hand and H. M. Borella. Dec 62, 70p S-224-R
Contract AT (29-1)-1183

Descriptors: (*Radiation measurement systems, Air), (*Data processing systems, Radiation measurement systems).

CONF-650304-1 **Field 9B, 12A**
CFSTI Prices: HC$1.00 MF$0.50
Knolls Atomic Power Lab., Schnectady, N. Y.
YATES ALGORITHM AND PROGRAMMING THE ANALYSIS OF VARIANCE OF FACTORIAL EXPERIMENTS FOR DIGITAL COMPUTERS,
by A. S. Covert. 1965, 15p
Contract W-31-109-eng-52
Presented at the General Electric Statistics Workshop Meeting, New York.

Descriptors: (*Programming (Computers), Analysis of variance), (*Algorithms, Programming (Computers)).

LA-3335 **Field 9B, 20B, 11F**
CFSTI Prices: HC$3.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
AN INTEGRATED SERIES OF CRYSTALLOGRAPHIC COMPUTER PROGRAMS. X. ANISOTROPIC STRUCTURE FACTOR CALCULATION AND POWDER PATTERN GENERATION,
by Allen C. Larson, R. B. Roof, Jr. and Don T.Cromer. Jan 65, 50p
Contract W-7405-eng-36

Descriptors: (*Programming (Computers), Crystal structure), (*Crystal structure, Anisotropy).

LA-3347 **Field 9B, 18K**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
COMPUTER PROGRAM FOR SOLUTION OF THE ENERGY BALANCE AND HEAT TRANSFER OF A PULSED THERMONUCLEAR REACTOR,
by J. E. Powers and F. L. Ribe. 1 Jun 65, 17p
Contract W-7405-eng-36

Descriptors: (*Programming (Computers), Thermodynamics), (*Thermal reactors, Programming (Computers)).

NVO-98-7 **Field 9F**
CFSTI Prices: HC$1.00 MF$0.50
National Marine Consultants Div., Interstate Electronics Corp., Anaheim, Calif.
LOCAL SAN CLEMENTE ISLAND TEST NO. 2,
Interim progress rept.,
by Allan R. Metzler. 4 Jun 65, 18p
Contract AT (26-1)-98,
Task 4

Descriptors: (*Telemeter systems, Test methods), (*Underwater, Telemeter systems).

ORNL-TM-1176 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
DIAGNOSE, A ROUTINE TO DEBUG FORTRAN PROGRAMS,
by J. A. Thompson. 25 Jun 65, 28p
Contract W-7405-eng-26

Descriptors: (*Programming (Computers), Corrections).

ORNL-3817 **Field 9B, 18J**
CFSTI Prices: HC$3.00 MF$0.50
Oak Ridge National Lab., Tenn.
CERL-II. A COMPUTER PROGRAM FOR ANALYZING HEMISPHERE-NOZZLE SHELLS OF REVOLUTION WITH AXISYMMETRIC AND UNSYMMETRIC LOADINGS,
by S. E. Moore, and F. J. Witt. Oct 65, 47p
Contract W-7405-eng-26

Descriptors: (*Programming (Computers), Stresses), (*Stresses, Structural shells).

Patent 3,219,497 **Field 9A, 13H**
PROCESS OF FABRICATING P-N JUNCTIONS FOR TUNNEL DIODES.
Patent assigned to Navy,
by Paul E. V. Shannon. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Semiconductor devices, Manufacturing methods), (*Tunnel diodes, Semiconductor devices), Metals, Alloys, Heating, Superconductors, Ultrasonic radiation, Bonded joints, Cavitation, Surface properties, Films, Patents.

Identifiers: Semiconductor junctions.

Fused p-n junctions with desirable tunnel diode characteristics are prepared by adhering a metallic dot to a semiconductive material by heating the dot to a temperature approximately 30 degrees above the melting point of the particular metal or alloy and applying ultrasonic vibrations to form a metal-to-semiconductor bond. The ultrasonic vibrations set up cavitation in the molten metal which removes the surface film under conditions where no fresh oxide can reform and also without damage to the semiconductive surface.

Patent 3,219,747 **Field 9A**
SHIELDING ARRANGEMENT WITH WAVE GUIDE BELOW CUTOFF.
Patent assigned to Army,
by James H. McAdams. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Waveguide windows, Electromagnetic shielding), (*Electromagnetic shielding, Waveguide windows), Radiofrequency interference, Protective coverings, Patents.

The housing of electromagnetic opaque material has an aperture in it. A door or cover completely covers the aperture to prevent transmission of electromagnetic energy through the aperture. The cover may have a rectangular configuration and may be supported by pivoted hinges, clamps and the like.

Patent 3,219,871 **Field 9A**
RUGGED MINIATURE ELECTRON TUBE.
Patent assigned to Army,
by Charles P. Marsden, Jr. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Subminiature electron tubes, Fuzes (Ordnance)), Anodes (Electron tubes), Cathodes (Electron tubes), Metals, Guided missile fuzes, Projectile fuzes, Patents.

The subminiature electron tubes are used in electric or electronic fuses and control devices employed in explosive projectiles, guided missiles and the like. A metallic conically-shaped anode serves as the envelope. A conically-shaped grid element is in spaced relationship to the anode. An insulating spacer maintains the anode and grid in spaced and hermetically sealed relationship. A second insulating member is hermetically sealed to the base of the grid and supports in inverted V-shaped cathode.

Patent 3,219,913 **Field 9E**
AUTOMATIC MAINTENANCE CIRCUIT.
Patent assigned to Army,
by Irving Brown. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Circuits, Maintenance), (*Voltage regulators, Maintenance equipment), Failure (Electronics), Automatic, Redundant components, Amplifiers, Reliability (Electronics), Relaxation oscillators, Patents.

The automatic maintenance circuit upon failure of an amplifier section, automatically switches to a standby amplifier which replaces the section that has failed. The principle of circuit redundancy is used to enhance the reliability of electronic equipment. A standby component is cross-connected with an operational component.

Patent 3,219,929 **Field 9C, 9B**
THERMIONIC SQUARE LAW INDICATING DEVICE WHEREIN CATHODE POWER DISSIPATION IS MAIN- TAINED CONSTANT TO PROVIDE AN INDICATION OF THE MAGNITUDE OF THE UNKNOWN SIGNAL.
Patent assigned to Navy,
by Arno M. King. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Measuring devices (Electrical + electronic), Numerical methods and procedures), (*Computers, Numerical methods and procedures), Potentiometers, Diodes (Electron tubes), Electric currents, Patents.

A square law device is provided which instantaneously squares a signal of sinusoidal or any other shape prior to any detection which might occur. A thermionic diode with limited emission filament is employed to achieve protection against overload and a unique arrangement for stabilizing the device against drift. The device is used in measurement and calculating applications.

Patent 3,219,930 **Field 9C**
CLAMP-ON TYPE HALL-GENERATOR MEASURING DEVICE.
Patent assigned to Army,
by Harry Sipler. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Measuring devices (Electrical + electronic), Electric currents), (*Electric currents, Measurement), Hall effect, Electric wire, Electric cables, Electric insulation, Digital computers, Checkout procedures, Patents.

The device is for measuring the current flowing in an insulated wire or cable without disconnecting the cable or making electrical contact with the conductor. It is used for checking out combat vehicles. Data are conveyed to a digital computer. A Hall generator is the sensing element of the device.

Patent 3,219,944 **Field 9E**
REACTANCE CONTROLLED TRANSISTOR OSCILLATOR CIRCUIT ARRANGEMENT.
Patent assigned to Navy,
by Robert Krausz and Jonas M. Shapiro. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Oscillators, Circuits), Transistors, Diodes (Semiconductor), Patents.

An accurate and precise reactance control circuit is provided which functions equally well over an extended frequency spectrum. A frequency control circuit is shown for use with a variable frequency oscillator. It introduces a constant change in frequency for a D.C. control bias voltage over at least a 2:1 frequency spectrum.

Patent 3,219,947 **Field 9A**
D. C. SATURABLE MAGNETIC CORE POWER SUPPLY CONVERTER.
Patent assigned to Navy,
by Morton Stimler. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Saturable reactors, Switching circuits), (*Switching circuits, Saturable reactors), Power supplies, Direct current, Electron tubes, Patents, Magnetic cores.

The saturable, transformer-type power supply converter is insensitive to nuclear radiation. A novel vacuum tube circuit is employed in combination with a saturable transformer whereby magnetic switching is accomplished independent of attendant nuclear radiation and high temperatures.

Patent 3,219,950 **Field 9A**
LOW-LOSS CONTINUOUSLY VARIABLE DELAY LINE.
Patent assigned to Army,
by Helmut Brueckmann. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Delay lines, Transmission lines), Ferrites, Dielectrics, Strip transmission lines, Coaxial cables, Electrical impedance, Air, Patents.

The continuously variable, low-loss delay line includes a transmission line section comprising a pair of conductors and a ferrite dielectric adapted to be slidably positioned relative to the conductors. The parameter of the ferrite dielectric is chosen such that the characteristic impedance of the transmission line remains constant regardless of the relative position of the ferrite dielectric with respect to the conductors. The ferrite dielectric is slidably positioned with respect to the conductors such that in one extreme position, the ferrite dielectric is coextensive with the conductors, and in the other extreme position, the ferrite dielectric is completely removed from the spacing between the conductors and replaced by an air dielectric.

Patent 3,219,951 **Field 9A**
INTERFERENCE ATTENUATING POWER CONDUCTOR UTILIZING INTENSIFIED SKIN EFFECT TO ATTENUATE HIGH FREQUENCIES.
Patent assigned to Navy,
by Don B. Clark. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Electric cables, Attenuation), High frequency, Electrical conductance, Permeability (Magnetic), Helixes, Ferromagnetic materials, Electric insulation, Patents.

The electric power cable is for delivering electric power to electronic installations sensitive to spurious electromagnetic interference frequencies. It includes a central core of high-conductivity, low-permeability material with a helical thread in its outer surface, a layer of low-conductivity, high-permeability ferromagnetic material in contact with the helical thread, and an outer covering of insulating material.

Patent 3,221,990 **Field 9B, 13G**
PURE FLUID SHIFT REGISTER.
Patent assigned to Army,
by Raymond W. Warren. 7 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Data storage systems, Fluid flow), (*Digital computers, Data storage systems), (*Computer storage devices, Fluid flow), Computer logic, Patents, Fluid amplifiers.

Identifiers: Shift registers.

The shift register performs a variety of functions in a digital system requiring the storage of data in digital form for utilization at a later time. A plurality of bi-stable 'flip-flops,' are utilized which serve as information storage units. Information entered into this series of the storage elements is then shifted successively from element to element in the series by drive pulses.

Patent 3,223,101 **Field 9B, 13G**
BINARY STAGE.
Patent assigned to Army,
by Ronald E. Bowles. 14 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Digital computers, Fluid amplifiers), (*Fluid amplifiers, Counting methods), Binary arithmetic, Patents, Fluid flow, Control systems.

The fluid amplifier is utilized in a computing system. The pure fluid binary counting stage comprises a pair of pure fluid amplifiers coupled together through a delay and energy storage system such that one of the fluid through a delay and energy storage system such that one of the fluid amplifiers changes state each time the other fluid amplifier receives a fluid input signal. All parts comprising the pure fluid binary stage remain stationary during operation thereof, and only the fluid employed as the working fluid moves in the binary counting stage.

Patent 3,224,674 **Field 9B, 13G**
HIGH-SPEED COUNTERS AND FLUID FORWARD-BACKWARD COUNTERS.
Patent assigned to Army,
by Raymond W. Warren. 21 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Counting methods, Fluid flow), (*Fluid flow, Computers), (*Digital computers, Fluid flow), Patents, Control systems.

The pure fluid forward-backward counter has a first input for receiving fluid signals which cause the counter to count up and a second input for receiving fluid signals which cause the counter to count down. A series of fluid pulse converters are provided which are uniquely interconnected by a plurality of fluid logic elements. The counters are used in digital computer systems.

PB-169 057 **Field 9A**
CFSTI Prices: HC$1.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
INVESTIGATIONS OF RARE-EARTH OXIDE CATHODES,
by G. B. Gaines. 1 Mar 60, 20p Scientific-2
Contract AF19 (604)-5691,
Proj. AF-4156,
Task 46310
AFCRL TN-60-559,
AD 239 317

Descriptors: (*Rare earth compounds, Oxides), (*Cathodes (Electron tubes), Rare earth compounds), (*Thermionic emission, Rare earth compounds), Gadolinium compounds, Neodymuim compounds, Diodes (Electron tubes), Electrophoresis, Coatings, Tungsten, Rhenium.

The thermionic emission from an additional gadolinium oxide sample was determined to be 1.6 amp/sq cm at 1400C. The calculated emission at 1500C is 4.4 amp/sq cm. There is a definite and reproducible break in the Richardson line at about 1175C. Diodes employing a mixture of gadolinium and neodymium oxides exhibited high emission values at low temperatures but tend to be unstable at temperatures above about 1300C. The cause of this instability will be sought in future work. (Author)

PB-169 064 **Field 9B, 6D**
CFSTI Prices: HC$5.00 MF$1.00
Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
AN APPLICATION OF STOCHASTIC AUTOMATA TO THE SYNTHESIS OF LEARNING SYSTEMS,
by K. S. Fu and R. W. McLaren. Sep 65, 161p
TR-EE65-17
Grant NSF-GP-2183,
Proj. PRF-3810

Descriptors: (*Learning machines, Synthesis), (*Automata, Stochastic processes), Mathematical models, Algorithms, Probability, Pattern recognition, Statistical processes, Adaptive systems.

In the synthesis of an engineering system in which a priori information concerning the system's environment is incompletely known to the designer, it is often an advantage to design the system to possess the property of learning. Several stochastic automaton models for learning systems are proposed. Such a model possesses Markov properties in that successive probability distributions of its response and environmental 'feedback' are related through a learning algorithm. These stochastic automaton learning models, interacting with a stochastic environment of unknown statistics, are

shown to possess the following learning behavior: (1) the performance measure converges monotonically in the mean sense to a final maximum (or minimum) value, (2) the interaction proceeds in an 'on-line' manner, and (3) in the time limit, the response of the learning system which extremizes the mean performance can be determined without error. The results of computer simulation of a character recognition device employing a linear discrete stochastic automation learning model are presented and discussed. (Author)

PB-169 148 **Field 9B, 5B**
CFSTI Prices: HC$1.00 MF$0.50
Western Reserve Univ., Cleveland, Ohio. Center for Documentation and Communication Research.
A MACHINE THAT DOES RESEARCH,
by Allen Kent. Apr 59, 6p
NSF Scientific Documentation Project.

Descriptors: (*Documentation, Computers), (*Computers, Documentation), (*Informational retrieval, Bibliographies), USSR, United States, Technical information centers.

Identifiers: All-Union Institute of Scientific and Technical Information.

A description is given of the Western Reserve Searching Selector, designed by J. W. Perry. With the assistance of human operators and a Flexowriter, the machine scans encoded abstracts of scientific articles and produces in typewritten form a bibliography of existing knowledge on a given problem. The activities of the Center in supplying a current awareness service to the American Society for Metals is described. The activities of VINITI in Moscow are described, and the question is raised whether the U.S. should have a national system of information facilities. The belief is expressed that the U.S. should (1) work with other nations in formulating a common machine language, (2) develop a series of integrated national and regional information centers to translate, encode, and made available the world's scientific research reports, and (3) increase government and private support of these efforts.

PB-169 165 **Field 9C**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
MESURE DE COURANTS CONTINUS INFERIEURS A 10 TO THE MINUS 10th POWER AMPERE ET DE RESISTANCES DE 10 TO THE 12th POWER OMEGA POUR COURANT CONTINU (MEASUREMENT OF DIRECT CURRENTS OF UNDER 10 TO THE MINUS 10th POWER AMPERE AND OF RESISTANCES OF 10 TO THE MINUS 12th POWER OMEGA FOR A DIRECT CURRENT),
by Jacques Vagner. Nov 65, 69p CEA-R-2834
Text in French; Attached Summary in English.

Descriptors: (*Direct currents, Measurement), (*Resistance (Electrical), Measurement), Generators, France.

Measurement of weak direct currents by Townsend's method using a vibrating condenser electrometer. Development of a current generator giving a pico-ampere independently of the resistance of the circuit used. Development of generators giving currents which may be adjusted continuously and exactly (0.1 to 1 pico-ampere, 1 to 10 pico-amperes, 10 to 100 pico-amperes). Measurement of very high resistances (10 to the 12th power ohms) by three different methods. Graphs are made by plotting the value of the resistance against the potential difference applied across it (from 50 millivolts to 50 volts). Two methods use adjustable current generators and the third is applicable to the measurement of resistances of between 10 to the 7th power and 10 to the 13th power ohms using a series of condensers ranging from 50 pico-farads to 10 microfarads. (Author)

PB-169 172 **Field 9B, 6D, 12A**
CFSTI Prices: HC$3.00 MF$0.75
Michigan Univ., Ann Arbor. Dept. of Philosophy.
PAPERS IN AUTOMATA THEORY: II
Final rept.,
by Stanley Tennenbaum, John P. Cleave, J. RichardBuchi and John Holland. Jan 62, 100p
Rept. no. 03586-1-F
Grant NSF-G-11046,
Proj. ORA-03586
See also PB-168 125.

Descriptors: (*Automata, Theory), (*Cybernetics, Automata), Computers, Computer logic, Programming (Computers), Mathematical logic, Set theory, Circuits, Iterative methods, Metamathematics, Modules (Electronic), Functions, Decision theory.

Identifiers: Turing machine.

The first two papers 'Inseparable Sets and Reducibility', by Stanley Tennenbaum (AD-265 771), and 'Creative Functions,' by John P. Cleave, develop concepts in the mathematical areas underlying automata theory. The next two papers, by I. Richard Buchi, 'Turing Machines and the Entscheidungsproblem' (AD-268 676, AD-618 795) and 'On a Problem of Tarski' (PB-149 795), employ automata theory in the solution of several outstanding problems in mathematics; the results thereby obtained also have consequences which apply back into automata theory. The final two papers are by John Holland and present some new ideas on the structure and use of computers. They are 'A Universal Computer Capable of Executing an Arbitrary Number of Sub-Programs Simultaneously' (PB-164 268) and 'Iterative Circuit Computers' (PB-166 480).

PB-169 177 **Field 9B, 5G, 6E**
CFSTI Prices: HC$5.00 MF$1.00
National Bureau of Standards, Washington, D.C. Applied Mathematics Div.
CONCORDANCE TO THE RULES OF PLACEBO V,
by William C. Watt and Robert W. Hsu. 5 Aug 65, 196p
Proj. NBS-205-205-2050404
See also C13.46-281.

Descriptors: (*Context free grammars, Medical research), Computational linguistics, Coding, Programming (Computers).

Identifiers: Placebo context-free grammar, Itself computer discourse.

The concordance is to context-free rules of the microgrammar PLACEBO V, numbering more than 2,000. Sources of the grammar's symbols are provided, not only the instantiating symbol (s) of the rule (s) at issue but the rule (s) as well, together with an index as to how many times the symbol occurs in each rule. The rules are alphanumericized by instantiating symbol.

PB-169 197 **Field 9E**
CFSTI Prices: HC$3.00 MF$0.75
TRG, Inc., Menlo Park, Calif.
OPTIMIZED FEEDS FOR THE WIRE-GRID LENS HF ANTENNA AT THE FAA RECEIVER STATION, MOLOKAI, HAWAII.
Final rept.,
by F. B. Harris, Jr., R. L. Tanner and E. M. Jones. Dec 65, 63p
Contract FAA/ARDS-598,
Projs. 232-001-01C, TRG-W102
SRDS RD-65-128

Descriptors: (*Lens antennas, Antenna feeds), (*Antenna feeds, Lens antennas), (*Electromagnetic lenses, Lens antennas), Direction finding, High frequency, Radio receivers, Hawaii.

Utilization of these optimized feeds in the lens greatly increases its gain as well as reducing the theoretical azimuth pattern side lobes, particularly at the low frequency end of the HF band. During the course of this program the originally installed Samoa and Nandi-Canton feeds were replaced with optimized feeds. Measurements made on these optimized feeds confirmed their predicted high efficiency of approximately 50 percent. The calculated efficiency of the optimized feeds is greater than that of the originally installed feeds by approximately 10 db at the low frequency end of the band and 8 db at the high frequency end of the band. Using a ground-based transmitter the measured power gain increase of the lens using the optimized feeds was approximately 7 db at the low frequency end of the band and approximately 4 db at the upper end of the band. Measured gain increases more closely approximating the feed efficiency increases would be expected if the ground-based transmitter were replaced with an airborne transmitter located at the elevation angles corresponding to the peak of the lens elevation patterns. (Author)

RFP-624 **Field 9B, 7E**
CFSTI Prices: HC$2.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
FORTRAN II DATA REDUCTION PROGRAM FOR GAS PHASE RADIOLYSIS STUDIES,
by G. J. Werkema. 3 Nov 65, 25p
Contract AT (29-1)-1106

Descriptors: (*Programming (Computers), Radiation chemistry), (*Radiation chemistry, Programming (Computers)).

SC-DC-65-1482 **Field 9B**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
PREPARATION AND COMPILATION OF EXPERIMENTAL DATA FOR COMPUTER ANALYSIS,
by Jack L. Mortley. Jun 65, 6p CONF-650622-1
Contract AT (29-1)-789
Presented at Hydraulics Colloquim, Iowa City, Iowa.

Descriptors: (*Programming (Computers), Experimental data).

SC-RR-65-212 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Panoramic Research, Inc., Palo Alto, Calif.
A SELF-ORGANIZED SYSTEM CALLED 'MICKEY MOUSE'.
Research rept. for year ending Mar. 64,
by Iben Browning. Apr 64, 40p
Contract AT (29-1)-789

Descriptors: (*Computer logic, Networks), (*Nervous system, Simulation).

SCL-DC-65-86 **Field 9B**
CFSTI Prices: HC$3.00 MF$0.75
IIT Research Inst., Chicago, Ill.
GRAPHICAL LATHE PART PROGRAMMING SYSTEM.
Final rept.
Jul 65, 68p
Contract AT (29-1)-789

Descriptors: (*Programming (Computers), Graphic).

SCL-DR-65-60 **Field 9B, 9A**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
CIRCUIT-BOARD PRODUCTION BY COMPUTER METHODS,
by L. A. James. Jun 65, 20p
Contract AT (39-1)-789

Descriptors: (*Templates, Production), (*Programming (Computers), Production control).

SU-SEL-64-133 **Field 9A, 9E, 18D**
CFSTI Prices: HC$5.00 MF$1.00
Stanford Univ., Calif. Stanford Electronics Labs.

QUARTERLY RESEARCH REVIEW NO. 11, OCTOBER 1 THROUGH DECEMBER 31, 1964.
1964, 171p
Contract AT (04-3)-326

Descriptors: (*Electronic equipment, Radiation measurement systems), (*Radiation measurement systems, Electronic equipment).

TID-21917 **Field 9E**
CFSTI Prices: HC$3.00 MF$0.50
Tennessee Univ., Knoxville. Dept. of Electrical Engineering.
TRIGGER POINT STABILITY OF EMITTER-COUPLED MONOSTABLE MUTIVIBRATORS.
Scientific rept. no. 4,
by D. W. Coffman, E. J. Kennedy and J. F. Pierce.
30 Jan 63, 51p
Contract W-7405-eng-26

Descriptors: (*Relaxation oscillators, Stability).

Y-KA-9 **Field 9B, 5C**
CFSTI Prices: HC$1.00 MF$0.50
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
PROVIDING REAL-TIME INFORMATION ON PRODUCTION SCHEDULES AND COSTS,
by A. M. Christman. 25 Jun 65, 21p CONF-650915-1
Contract W-7405-eng-26
Prepared for presentation at Systems Engineering Conference, Chicago.

Descriptors: (*Programming (Computers), Production control), (*Costs, Scheduling).

10. ENERGY CONVERSION (NON-PROPULSIVE)

AD-270 455 **Field 10B, 22B**
CFSTI Price: HC$2.00
Aeronautical Systems Div., Air Force Systems Command, Wright-Patterson AFB, Ohio. Electronic Technology Lab.
AN INVESTIGATION OF SOLAR CELL CAPABILITIES FOR SATELLITE APPLICATIONS.
Technical rept.,
by R. W. Runnels. Nov 61, 47p
Proj. AF-3145,
Task 42009
ASD TR-61-334

Descriptors: (*Solar cells, Satellites (Artificial)), (*Satellites (Artificial), Solar cells), Space environmental conditions, Performance (Engineering), Barometric pressure, Temperature, Van Allen radiation belt, State-of-the-art reviews, Earth, Mars, Venus.

This report covers an investigation of the physical and electrical characteristics of solar cells constructed of several different materials and by different manufacturers. The solar spectrum as found outside the atmosphere at the earth's mean orbit is presented. Energy levels in the vicinity of earth, Mars, and Venus are given, as well as the thermal and pressure conditions expected. The radiation of the Van Allen belts and the effects upon the various types of cells are discussed. Several techniques for solar simulation are given and the approach to solar simulation by the Electronic Technology Laboratory is identified.

AD-454 913 **Field 10C**
CFSTI Price: HC$5.00
Monsanto Research Corp., Everett, Mass. Boston Lab.
RESEARCH ON ORGANIC DEPOLARIZERS.
Final rept., 1 Jul 61-30 Jun 64,
by B. A. Gruber, E. A. McElhill and D. L. Williams.
30 Jun 64, 186p MRB4006F
Contract DA-36-039-sc-87336,
Proj. DA-1G622001A053
N65 16559

Descriptors: (*Batteries ; components, Materials), (*Primary cells, Organic materials), (*Cathodes (Electrolytic cell), Organic materials), Polarization, Inhibition, Organic nitrogen compounds, Halogenated hydrocarbons, Peroxides, Nitrobenzenes, Electrical properties, Electrical discharges, Electrolytes, Magnesium compounds, Perchlorates.

Identifiers: Dinitrobenzenes, Depolarizers (Electrical).

About 200 organic compounds were tested as cathode materials. The results are tabulated for both experimental and theoretical coulombic capacities and for both load and open-circuit potentials. The best depolarizers generally belong to one of the following groups: nitro compounds (RN02), positive halogen compounds (ROX and RNX), halogen addition compounds (R3NX2) or peroxides (ROOR). A quantitative measure of the effect of substituents on nitro-aromatics was found by correlating the initial reduction potential with the Hammett sigma constant. The m-dinitrobenzene bobbin system was studied to determine the importance of depolarizer solubility, carbon and electrolyte conductivity, and water content. Cathode potential measurements taken within the bobbin indicated resistance build-up and current distribution during discharge. A high cathode water content and a high concentration of Mg (C104)2 electrolyte were found to be advantageous. A mathematical analysis of Euler and Nonnenmacher was used to analyze the potential electrode position data in terms of carbon and electrolyte resistance and a polarization 'resistance'. (Author)

GA-5552 **Field 10A**
CFSTI Prices: HC$1.00 MF$0.50
General Atomic, John J. Hopkins Lab. for Pure and Applied Science, San Diego, Calif.
ENERGY-TRANSFER CORRELATIONS ON A CYLINDRICAL CESIUM THERMIONIC CONVERTER,
by J. W. Holland. 1 Aug 64, 16p CONF-564-3
Contract AT (04-3)-167
Presented at Colloquium on Interaction between Electromagnetic Waves and Plasma Saclay, France, Sept. 1964.

Descriptors: (*Thermionic converters, Cesium), (*Heat transfer, Thermionic converters).

NAA-SR-MEMO-8339 **Field 20N**
CFSTI Prices: HC$1.00 MF$0.50
Atomics International, Canoga Park, Calif.
SMALL SHAKER RESONANCE SEARCH METHOD,
by H. R. Kapp. 30 Sep 64, 23p
Contract AT-11-1-GEN-8

Descriptors: (*Nuclear power plants, Spacecraft), (*Vibration, Tests).

NAA-SR-MEMO-9202 **Field 18K, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Atomics International, Canoga Park, Calif.
NAA PROGRAM DESCRIPTION-S 4 CYLINDRICAL GEOMETRY CELL CODE,
by Joanne S. Temple and R. A. Blaine. Nov 63, 19p
Contract AT-11-1-GEN-8

Descriptors: (*Programming (Computers), Neutron transport theory), (*Neutron transport theory, Programming (Computers)).

NYO-3429-4 **Field 10A**
CFSTI Prices: HC$4.00 MF$0.75
Radio Corp. of America, Lancaster, Pa. Direct Energy Conversion Dept.
THE DEVELOPMENT OF AN IMPROVED THERMIONIC ENERGY CONVERTER.
Final technical rept. Jun 26, 64-Jun 25, 65.
May 65, 84p
Contract AT (30-1)-3429

Descriptors: (*Thermionic converters, Design).

Patent 3,219,849 **Field 10B**
FISSION ELECTRIC GENERATOR.
Patent assigned to NASA,
by Walter F. Krieve. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Generators, Fission), Compton scattering, Beta decay, Nuclear radiation, Anodes (Electrolytic cell), Cathodes (Electrolytic cell), Gamma rays, Patents.

The generator converts energy emitted by fissionable material directly into electrical energy. By utilizing an anode having a predetermined thickness, the net current contribution by beta decay and Compton scattering may be cancelled so as to have essentially zero effect; thereby adapting the cell to the study of positive particle-caused currents alone and to the observation of changes in particle-caused currents, due to varying geometry and operating conditions of the generator cell, without the need of compensating for changes in beta decay and Compton scattering current.

TID-22009 **Field 10A, 21E**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Mines, Morgantown, W. Va. Coal Research Center.
HIGH-TEMPERATURE ENERGY SYSTEMS.
Quarterly progress rept., Feb 1-April 30, 65.
1965, 43p

Descriptors: (*Gas turbines, Brayton cycle).

11. MATERIALS

AD-454 763 **Field 11F, 13H**
CFSTI Price: HC$3.00
Naval Weapons Lab., Dahlgren, Va.
THE EFFECTS OF EXPLOSIVELY INDUCED STRESS WAVES ON THE MECHANICAL PROPERTIES OF SEVEN METALS,
by Lester A Potteiger. 20 Nov 64, 54p NWL-1954
Task RUME-4E-000/210-1/F009-08-05

Descriptors: (*Alloys, Detonation waves), (*Detonation waves, Alloys), Mechanical properties, Copper alloys, Nickel alloys, Stainless steel, Steel, Stresses, Tensile properties, Hardness, Explosive materials, TNT, Microstructure, Impact shock, Velocity.

An oblique stress wave of approximately 160-205 kilobars was induced in metal specimens of cupronickel, inconel, monel, 'A' nickel, stainless steel, and low carbon steel by detonation of TNT, H-6, and Composition B explosives in direct contact. The effects of this stress application were to increase tensile strengths by 18 to 107%, to increase hardnesses 49 to almost 200%, and to reduce impact strengths approximately 30 to 80%, depending on the type of metal and explosive. Composition B explosive was found to produce a greater change in the mechanical properties than either TNT or H-6. (Author)

AD-461 357 **Field 11D**
CFSTI Price: HC$2.00
General Electric Co., Philadelphia, Pa. Missile and Space Div.
DEVELOPMENT OF COMPOSITE STRUCTURAL MATERIALS FOR HIGH TEMPERATURE APPLICATIONS.
Final rept. 1 Sep 63-31 Dec 64,
by W. H. Sutton, J. Chorne, A. Gatti and E. Sauer.
Feb 65, 50p
Contract NOw-60-0465-D

Descriptors: (*Composite materials, Single crystals), (*Ceramic fibers, Composite materials), (*Single crystals, Composite materials), Refractory materials, Sapphires, Reinforcing materials, Aluminum compounds, Oxides,

Metal coatings, Whiskers (Crystals), Surface-active substances, Tungsten, Rhenium, Palladium alloys, Nickel alloys, Tensile properties.

The purpose of this program is the development of new structural composite materials with high strength-to-weight ratios at elevated temperatures. The current effort is being directed towards the reinforcement of Ni/Ni-alloys by using ultra-high strength A1203 single crystal filaments (whiskers). The major emphasis during this reporting period was placed on the fabrication of A1203 whisker-Ni-Pd alloy composites. Practical and theoretical considerations on fabricating whisker reinforced composites by vacuum infiltration techniques are presented. A technique for the separation and classification of whiskers, as supplied by the batch process, was developed. A Ni/Pd alloy was selected as a matrix to be used in the study of whisker reinforcement. A fused-silica was selected for the mold material. Development of stable, adherent metallic coatings, on the whisker surfaces was undertaken. W and Re have shown the greatest promise. It was found that both metals would promote wetting between the Ni/Pd alloy matrix and the A1203 whiskers. (Author)

AD-461 825 **Field 11F, 13H**
CFSTI Price: HC$3.00
Battelle Memorial Inst., Columbus, Ohio.
THE PROCESSING AND PROPERTIES OF HASTELLOY C,
by J. H. Gehrke, C. M. Jackson andF. W. Boulger.
28 May 64, 51p
Contract DA-01-021-AMC-203 (Z)
RSIC 228

Descriptors: (*Nickel alloys, Corrosion-resistant alloys), (*Corrosion-resistant alloys, Nickel alloys), Molybdenum alloys, Iron alloys, Chromium alloys, Tungsten alloys, Hardening, Physical properties, Mechanical properties, Melting, Bending, Machining, Joining, Cleaning, Heat treatment, Corrosion resistance, Processing.

Identifiers: Hastelloy C.

The report presents a compilation of available information on the properties and processing characteristics of Hastelloy C, for use in connection with the possible utilization of this alloy for the transport of gaseous oxygen (GOX) in S-1C Saturn. The topics covered include phase relationships, hardening mechanisms, physical and mechanical properties, melting procedures, procedures for primary fabrication, bending, machining, joining, degreasing, light pickling, heat-treating schedules and atmospheres, and corrosion behavior. (Author)

AD-462 896 **Field 11F, 13I**
CFSTI Price: HC$4.00
SKF Industries, Inc., King of Prussia, Pa. Research Lab.
STRUCTURAL STUDIES OF BEARING STEEL UNDERGOING CYCLIC STRESSING.
Summary rept. no. 1,
by J. A. Martin, S. F. Borgese, Y. P. Chiu, andA. D. Eberhardt. 3 May 65, 106p AL-65M030
Contract Nonr-4433 (00),
Proj. SKI-10-3

Descriptors: (*Bearings, Steel), (*Steel, Microstructure), Fatigue (Mechanics), Stresses, Fracture (Mechanics), Fractography, Electron microscopy, Carbides.

The development of white etching areas in hardened steels is a well known phenomenon associated with cyclic stressing in rolling contact. This particular type of microstructural change has been studied in detail and the following characteristics of white etching areas have been determined: (1) Their shape and size; (2) their orientation to the surface; (3) the density distribution of white areas with depth has been determined and related to the distribution of shear stresses with depth below the contact surface; (4) the rate of white area development with cycling has been compared for two groups of bearings (a) an air melt 52100 steel group which exhibited average group life behavior, and (b) a group of bearings made from the fifth vacuum remelt of the same steel described above, which exhibited a group life nearly 4 times higher than the above group; (5) The tempering behavior of white areas has been studied in detail between room tempera-ture and 750C; and (6) The appearance of white areas after treatment with different etchants and various degrees of etching have been studied by light and electron replica microscopy. A second microconstituent in the vicinity of white etching areas was identified as carbides. (Author)

AD-463 172 **Field 11B, 20B, 7D, 8G**
CFSTI Price: HC$1.00
Ohio State Univ. Research Foundation, Columbus.
RESEARCH ON PHASE EQUILIBRIA APPROACH TO GROWTH OF DOPED SINGLE CRYSTALS OF REFRACT- ORY COMPOUNDS.
Final rept. for 1 Sep 63-31 Aug 64,
by W. C. Beard, J. E. Bradley, W. C. Butterman andW. R. Foster. Jan 65, 20p Rept. no. 4
Contract AF33 (615)-1027,
Proj. AF-7021,
Task 7021-02
ARL 65-20

Descriptors: (*Refractory materials, Crystal growth), (*Minerals, Phase studies), (*Ceramic materials, Phase studies), Single crystals, Doping, Titanium compounds, Oxides, Germanium compounds, Boron compounds, Zirconium compounds, Silicates, Magnesium compounds, Transformations, Solid solutions, Melting, Liquids, Solids, Dioxides, Titanates, High-temperature research, Crystal structure, Petrography.

The report covers research on phase equilibrium relations in the systems TiO2, GeO2-B2O3, and ZrSiO4, and on the growth of single crystals of MgTiO3. The polymorphic relations between the rutile, brookite and anatase forms of TiO2 was investigated. A tentative phase diagram for the system GeO2-B2O3 was prepared. A reconnaissance study of the feasibility of producing single crystals of MgTiO3 has been carried out. Several promising methods were indicated, but limitations of time and of equipment did not permit extension of the small-scale tests to the scale required for acceptable crystal-size. (Author)

AD-463 850 **Field 11J**
CFSTI Price: HC$3.00
FMC Corp., Princeton, N. J. Chemical Research and Development Center.
SYNTHESIS OF HIGH-STRENGTH CHEMICAL RESISTANT ELASTOMERS FOR EXTREME TEMPERATURE SERVICE.
Final rept.,
by E. W. Cook, C. A. Erickson and J. A. Gannon.
Jan 65, 86p
Contract DA-19-129-AMC-147 (N),
Proj. DA-1CO-24401-A113
USA NLBS C/OM-4

Descriptors: (*Elastomers, Synthesis (Chemistry)), Fluorine compounds, Vinly plastics, Alkenes, Polymerication, Glycols, Ketones, Siloxanes, Phosphoric acids, Isocyanic acids, Isocyanate plastics, Organic sulfur compounds, Monocyclic compounds, Chlorine compounds, Bromine compounds, Silanes, Transition temperature.

The synthesis of new fluorinated elastomers servicable at low temperatures is described. Hexafluoroacetone and hydrogen-containing olefins have been found to form both low polymers and hydrogen-containing oxetanes on actinic irradiation. Evidence is presented to show that the intermediate is a biradical. A new elastomer system has been discovered involving the condensation of a polyfluorinated diol with a fluorocarbon diene. This unique fluorinated polyether has been found to have a very low T sub g (-54 C). Evidence has also been found that a polyfluorinated diol will condense with hexafluorobenzene. Polyurethane polymers have been successfully formed by condensation of a polyfluorinated diol with phosphorous-containing diisocyanates. Several new monomers are described. (Author)

AD-463 881 **Field 11I, 7C, 20B**
CFSTI Price: HC$4.00
Rensselear Polytechnic Inst., Troy, N. Y.
EXTENDED CHAIN POLYMER CRYSTALS.
Doctoral thesis,
by Tamio Arakawa. Apr 65, 114p Technical rept. TR-8
Contract Nonr-591 (19),
Proj. NR-051-428

Descriptors: (*Polyethylene plastics, Crystals), (*Polymers, Crystals), Crystallization, High-pressure research, Differential thermal analysis, Density, Dilatometers, X-ray diffraction analysis, Electron diffraction analysis, Calorimetry, Melting, Molecular structure, Crystal structure, Melting point.

Identifiers: Polymethylenes.

Linear polyethylene (LPE) and polymethylenepolyethylene copolymers were crystallized from melts under high pressure and then examined by means of differential thermal analysis, density determination, dilatometry, x-ray diffraction analysis (both wide and small angle), electron microscopy, and calorimitry. It is shown that (1) such polymers can be crystallized in the form of very thick lamallae having negligibly small surface energy effects; (2) molecular chains are fully extended in such lamallae; (3) the equilibrium m.p. of an infinite molecular weight LPE is 141.4C; (4) the lamellae can easily be superheated during melting; (5) the m.p. of lamella of LPE is not depressed by the introduction of up to 2 Me or Et side chains per 100 chain C atoms; (6) the formation of extended chain lamellae is hindered by the introduction of side chains.

AD-465 908 **Field 11F, 13H**
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Metals Processing Lab.
DEFORMATION PROCESSING OF ANISOTROPIC METALS.
Progress rept. nos. 4 and 5, 1 Jan-30 Apr 65,
by D. H. Avery and W. A. Backofen. Jun 65, 36p
Contract Now-65-0124-d

Descriptors: (*Metals, Deformation), (*Mechanical working, Metals), Plasticity, Strain (Mechanics), Stresses, Anisotropy, Temperature, Crystal lattice defects, Theory, Creep, Bibliographies, Lead alloys, Tin alloys.

A phenomenological explanation of superplasticity in metals has been based on the observation of a strong strain-rate dependence of flow stress, comparable to that of heated polymers and approaching that of hot glass. A structural basis for such high rate sensitivity is suggested in the present paper. It is argued that at temperatures above about 0.5 T sub m two competitive processes contribute to deformation. One involves dislocation motion and is responsible for a sigma- epsilon relationship in which d sigma/d epsilon falls with increasing epsilon, e.g., epsilon = A sinh B sigma. The other is a viscous flow growing out of vacancy migration and is represented in the Nabarro-Herring analysis as epsilon = (alpha D/L to the second power KT) sigma. Three predictions follow from the argument: (1) a 'transition strain rate', epsilon sub t, exists below which rate sensitivity is high because N-H deformation predominates and above which rate sensitivity is much reduced, permitting only limited neck-free flow, because the greater contribution now comes from dislocation motion; (2) well below epsilon sub t the flow stress varies with the square of the vacancy diffusion-path length, L, or what is roughly equivalent, the metallographic mean-free path between grain boundaries in an equiaxed microstructure; (3) epsilon sub t is about 1/L to the second power.

AD-465 922 **Field 11I, 7D, 20M, 21B**
CFSTI Prices: HC$2.00 MF$0.50
Stevens Inst. of Tech., Hoboken, N. J. Dept. of Mechanical Engineering.

ENERGETICS AND CHEMICAL KINETICS OF POLYSTYRENE SURFACE DEGRADATION IN INERT AND CHEMICALLY REACTIVE ENVIRONMENTS,
by Robert F. McAlevy, III, and James G. Hansel.
Jul 65, 36p Technical rept. ME-RT-65006
Contract Nonr-263 (48),
Proj. NR-092-512

Descriptors: (*Styrene plastics, Degradation), Vaporization, Thermodynamics, Reaction kinetics, Nitrogen, Nitrogen compounds, Oxides, Chlorine, Porous materials, Calorimetry, Surfaces, Combustion, Theory, Propellants.

Polystyrene degradation-vaporization produced by intense surface heating was studied experimentally. Specimens were immersed in the exhaust jet of a small laboratory rocket motor, and the linear regression rate was measured as a function of surface heating rate; corresponding surface temperature levels were obtained by monitoring the thermal radiation emitted from the heated surface. Porous specimens, through which a series of test gases were passed to emerge at the heated surface, permitted these data to be gathered in chemically reactive environments. Correlation of all these data, in both inert and chemically reactive environments, was possible both on the basis of an energy balance struck at the regressing surface and an Arrhenius type of chemical kinetic description of the surface degradation process. Although expected, this represents the first demonstration that both relations are satisfied simultaneously- a result of great importance to the formulation of combustion theories of, e.g., hybrid rocket motors, solid propellant ignition, flame spreading, and deflagration. (Author)

AD-466 993 **Field 11I, 7C**
CFSTI Prices: HC$1.00 MF$0.50
Naval Air Engineering Center, Philadelphia, Pa. Aeronautical Materials Lab.
PRELIMINARY RESEARCH ON LAMINATING POLYURETHANE SYSTEMS OF EXCEPTIONAL THERMAL STABILITY WITH ATTENDENT GOOD MECHANICAL PROPERTIES.
Progress rept.,
by H. J. Lee. 1 Jul 65, 11p NAEC-AML-2237
Task RRMA-03-004/200-1/R007-04-01

Descriptors: (*Laminated plastics, Mechanical properties), (*Isocyanate plastics, Thermal stability), (*Heat-resistant plastics, Isocyanate plastics), High-temperature research, Data, Weight.

The preliminary research on laminating polyurethane systems possessing good thermal stability with accompanying highly desirable mechanical properties is reported. In the main, two systems were observed to fulfill the first requirement, but the degree of fulfillment of the second requirement concurrent with the first has yet to be measured. These outstanding systems were synthesized from diphenylmethane 4,4' - diisocyanate with a glycol polymer of diethylene glycol terephthalate and diphenylmethane 4,4' - diisocyanate with 3,3' bis (p-hydrosy phenyl) phthalide. (Author)

AD-467 033 **Field 13H 11F**
CFSTI Prices: HC$4.00 MF$1.00
Battelle Memorial Inst., Columbus, Ohio.
NONDESTRUCTIVE MEASUREMENT OF RESIDUAL STRESSES IN METALS AND METAL STRUCTURES,
by Koichi Masubuchi. 30 Apr 65, 134p
Contract DA-01-02-AMC-11706 (Z)
RSIC 410

Descriptors: (*Aluminum alloys, Stresses), (*Non-destructive testing, Metals), X-ray diffraction analysis, Strain (Mechanics), Relaxation time, Corrosion, Quenching (Cooling), Machining, Material forming, Welding, Mathematical analysis, Strain gages, Measurement, Ultrasonic radiation, Hardness, Fracture (Mechanics).

The report presents a state-of-the-art survey of the nondestructive measurement and evaluation of residual stresses produced in metals and metal structures. The report is concerned primarily with residual stresses produced during the fabrication of structures made of high-strength aluminum alloys. Discussions are presented in four sections which provide the following: fundamental information on residual stresses that is needed to understand measurement techniques; review of methods of measuring residual stresses, including stress-relaxation techniques, X-ray diffraction technique, the ultrasonic technique, the hardness technique, and cracking technique; measurement of residual stresses during fabrication of metal structures (methods of measuring residual stresses and typical experimental data are described); selection and use of appropriate measurement techniques and evaluation of results. On the basis of findings obtained during this survey, recommendations are given for future research on nondestructive measurement of residual stresses produced during fabrication of metal structures. (Author)

AD-467 088 **Field 11F, 13J**
CFSTI Prices: HC$2.00 MF$0.50
Navy Marine Engineering Lab., Annapolis, Md.
FRACTURE BEHAVIOR OF TITANIUM IN THE MARINE ENVIRONMENT,
by I. R. Lane, Jr., J. L. Cavallaro, and A. G. S. Morton. Jul 65, 47p MEL-231/65
Projs. S-F013 01 03; S-R007 012,
Tasks 0216, 0704

Descriptors: (*Titanium alloys, Fracture (Mechanics)), (*Stress corrosion, Titanium alloys), (*Submarine hulls, Titanium alloys), Aluminum alloys, Niobium alloys, Tantalum alloys, Tin alloys, Vanadium alloys, Molybdenum alloys, Brittleness, Sea water, Deep submergence, Sensitivity, Heat treatment, Toughness, Welds.

This investigation of the fracture behavior of titanium in the marine environment evaluated a spectrum of titanium alloys for loss of fracture resistance in seawater. A comparison of the wet-stress-cracking behavior was made with metallurgical variables. Sensitivity was found to be related to the titanium-aluminum embrittling reaction and was dependent on aluminum content, isomorphous beta stabilizer content, and heat treatment. Control of the factors leading to the titanium-aluminum reaction appears to provide a means of eliminating the problem or reducing it to the extent that alloys will be safe to use. A program to accomplish such control is outlined. (Author)

AD-468 229 **Field 11I, 20M**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
THE THERMODYNAMICS OF THE TEFLON-FLUOROCARBON VAPOR SYSTEM,
by F. J. Krieger. Jul 65, 34p RM-4634-PR
Contract AF 19 (638)-700
N65 30935

Descriptors: (*Ablation, Thermodynamics), (*Halocarbon plastics, Ablation), Vapors, Fluorine, Carbon, Halogenated hydrocarbons, Mathematical analysis, Tables, Temperature, Pressure, Molecular weight, Enthalpy, Entropy.

The report is one of a series of mathematical studies of ablative materials. An investigation was undertaken of the thermodynamics of teflon over a range of temperature up to 6000K and pressures up to 100,000 atmospheres. Two sets of equilibrium composition equations are employed: one representing a pure gas phase; the other, a heterogenous system of gas and solid carbon. Results of the computational program are presented in both tabular and graphic form. (Author)

AD-468 299 **Field 11F, 13H**
CFSTI Prices: HC$3.00 MF$0.75
Climax Molybdenum Co. of Michigan, Detroit.
DEVELOPMENT AND EVALUATION OF TUNGSTENBASE ALLOYS.
Final rept., 10 Jan 64-10 Mar 65,
by M. Semchyshen, Robert Q. Barr and Eric Kalns.
10 Aug 65, 98p
Contract NOw-64-0057-c

Descriptors: (*Tungsten alloys, Heat-resistant metals + alloys), Niobium alloys, Hafnium alloys, Zirconium alloys, Carbon alloys, Boron alloys, Vacuum furnaces, Sintering, Extrusion, Chemical analysis, Recrystallization, Aging (Materials), Tensile properties, Microstructure, Creep, Rupture (Mechanics), Grain structures (Metallurgy).

The investigation is concerned with the development of tungsten-base alloys having high strengths at elevated temperatures. The major portion of the alloys are ternaries containing carbon and up to nominally 0.5% Zr, 1% Hf or 2% Cb as the alloy additions; however, several quaternary alloys are included which contain carbon and the same alloying elements in various combinations. In addition, boron was substituted for carbon in three of the heats. All of the alloys were consolidated by vacuum-arc-melting. Primary working of the as-cast ingots was achieved by extrusion; the tungsten-base alloy blanks were encapsulated in molybdenum prior to extrusion. Additional working of the extruded materials was attempted by swaging. Even though the facilities utilized for swaging had temperatures available for heating of the work up to 3500 F, the working temperatures were too low for successful swaging of the extruded billets, and, as a result, only two alloys yielded reasonable stock after swaging. Strength properties and recrystallization temperatures are reported for the alloys after extrusion and after swaging. It is shown that both strength and recrystallization temperature are dependent on the carbon as well as the metallic alloy content. (Author)

AD-470 969 **Field 11C, 13J**
CFSTI Prices: HC$2.00 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
PROTECTIVE COATINGS FOR STEEL PILING: CORRELATION OF RESULTS OF PARALLEL TEST EXPOSURES AT PORT HUENEME AND GUAM,
by C. V. Brouillette and R. L. Alumbaugh. Aug 65, 29p Technical rept. R-397
Task Y-R007-08-04-401

Descriptors: (*Steel, Protective treatments), (*Protective treatments, Steel), (*Coatings, Steel), Structural parts, Harbors, Paints, Effectiveness, Plastic coatings, Vinyl plastics, Phenolic plastics, Environmental tests, Underwater, Failure (Mechanics), Damage, Metal coatings, Synthetic rubber, Rubber coatings, Sea water.

By means of a parallel study, seven coating systems, selected from a previous study at Port Hueneme, were evaluated by the U. S. Naval Civil Engineering Laboratory and by the Materials Testing and Evaluation Division, OICC, Marianas, as protective coating systems for steel piles. The systems were applied to both sheet and 'H' piles. The coated piles were driven and exposed in the surf at the Port Hueneme outer harbor and off Cabras Island in the harbor at Guam, and the condition of the coatings was inspected periodically. At the conclusion of a 30-month exposure at Port Hueneme and a 48-month exposure period at Guam, all seven systems showed some coating failure resulting either from the driving operation or the exposure conditions. Moderate to heavy damage to all systems was caused just above the mudline by the abrasive action of backwash in the surf at Port Hueneme. Coating failure, resulting in pitting, was observed in all coatings just below the mudline at Guam. On a combined performance basis a vinyl mastic, a phenolic mastic, and the Navy Saran coating are considered essentially equal. On a total applied cost basis the vinyl mastic and the Saran are preferred, with the Saran being slightly more economical. (Author)

AD-473 790 **Field 11D, 11I, 11E**
CFSTI Prices: HC$3.00 MF$0.75
Wisconsin Univ., Madison.
ANALYTICAL PROCEDURES FOR PREDICTING THE MECHANICAL PROPERTIES OF FIBER REINFORCED COMPOSITES.

Technical documentary rept., 15 Jul 64-15 Jul 65,
by Gerald Pickett. Jun 65, 87p
Contract AF33 (615)-2030,
Proj. AF-7340,
Task 734003
AFML TR-65-220

Descriptors: (*Fibers, Reinforcing materials), (*Composite materials, Fibers), (*Plastics, Composite materials), Mathematical prediction, Mechanical properties, Elasticity, Least squares method, Fourier analysis, Tapes, Loading (Mechanics), Shear stresses, Programming (Computers), Mathematical analysis, Fibers (Synthetic).

The basic problem is to determine the elastic moduli for fiber reinforced plastic material if the elastic moduli of the constituents are known. Two geometries are investigated in this report. The first is a regular hexagonal array of uniform circular fibers. The second is a tape with a single row of circular fibers. Computer programs are obtained which compute the composite elastic moduli and also the micro stress in terms of macro strains at the boundary between fiber and resin. The procedure is to write solutions of the equations of elasticity which are valid in the fiber and resin elements, and which are appropriately periodic. The coefficients in the solution are determined by satisfying the boundary conditions by the method of least squares or by a combination of the Fourier Method with the Method of Least Squares. (Author)

BM-RI-6570 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Mines, Boulder City, Nev. Metallurgy Research Lab.
ELECTROREFINING BERYLLIUM. TWO-CYCLE ELECTROLYSIS,
by M. M. Wong and D. A. Okeef. Jun 64, 10p
Prepared in cooperation with University of California, Lawrence Radiation Lab.

Descriptors: (*Refining (Metallurgy), Beryllium), (*Electrolysis, Beryllium).

BNWL-131D **Field 11F, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
FABRICATION COSTS FOR PLUTONIUM FUEL ELEMENTS. PART D. VARIABLE COST OF FABRICATING UO2-PUO2 FUEL ELEMENTS FOR THE PLUTONIUM RECYCLE TEST REACTOR,
by C. H. Bloomster. Oct 65, 21p
Contract AT (45-1)-1830

Descriptors: (*Plutonium, Reactor fuel elements).

BNWL-162 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
A STUDY OF TUNGSTEN-TECHNETIUM ALLOYS.
Quarterly progress rept., 1 Jul 65-1 Oct 65.
Oct 65, 3p
Contract AT (45-1)-1830

Descriptors: (*Tungsten alloys, Technetium).

COO-1000-1 **Field 11F**
CFSTI Prices: HC$3.00 MF$0.75
Toledo Univ. Research Foundation, Ohio.
A STUDY OF THE OXIDATION OF ZIRCONIUM-NIOBIUM ALLOYS IN THE TEMPERATURE RANGE 300 DEGREE--500 DEGREE C.
Final technical rept.,
by Otto Zmeskal and Kuang-Hui Lin. 3 Mar 65, 68p
Contract AT (11-1)-1000

Descriptors: (*Zircoonium alloys, Oxidation), (*Niobium alloys, Oxidation).

EURAEC-1237 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Societe detudes, de Recherches et d'Applications pour l'Industrie, Brussels (Belgium).
STUDIES ON THE CORROSION OF STEELS IN HIGH TEMPERATURE WATER AND STEAM.
Quarterly rept. no. 9, 1 Jul-30 Sep 64.
30 Oct 64, 48p Ref-BS-1732
Contract 089-62-7 RDB,
Proj. 290

Descriptors: (*Stainless steel, Corrosion), (*Corrosion, Stainless steel).

EURAEC-783 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Compagnie Pechiney, Chambery (France).
CORROSION TESTING.
Quarterly rept. no. 5, 1 Apr 63- 30 Jun 63.
31 Jul 63, 26p
Contract 067-62-4 RDF

Descriptors: (*Corrosion, Aluminum alloys), (*Tin alloys, Corrosion).

KAPL-3073 **Field 11F**
CFSTI Prices: HC$3.00 MF$0.75
Knolls Atomic Power Lab., Schenectady, N. Y.
DEVELOPMENT OF A TRANSITION JOINT BETWEEN ZIRCALOY-4 AND Ni - Cr - Fe (ALLOY 600),
by G. E. Halm and E. O. Proter. 2 Nov 64, 64p
Contract W-31-109-eng-52

Descriptors: (*Joints, Alloys), (*Zirconium alloys, Nickel alloys).

NAA-SR-10487 **Field 11F, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
EFFECT OF CARBURIZATION ON THE LOW STRAIN RATE BEHAVIOR OF TYPE 304 STAINLESS STEEL.
Interim rept.,
by D. H. Stone and A. D. Schwartz. 31 Aug 65, 32p
Contract AT (11-1)-GEN-8

Descriptors: (*Stainless steel, Reactor materials), (*Case hardening, Stainless steel).

ORNL-TM-1165 **Field 11F, 18I**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
NICHROME-ALUMINUM JOINING METHOD EVALUA- TION,
by J. J. Prislinger. 13 May 65, 16p
Contract W-7405-eng-26

Descriptors: (*Joining, Alloys), (*Aluminum alloys, Nickel alloys).

ORNL-3681 **Field 11B, 18J**
CFSTI Prices: HC$5.00 MF$1.25
Oak Ridge National Lab., Tenn.
SUMMARY OF THE KILOROD PROJECT. A SEMIREMOTE 10-KG/DAY DEMONSTRATION OF 233UO2-THO2 FUEL ELEMENT FABRICATION BY THE ORNL SOL-GEL VIBRATORY-COMPACTION METHOD,
by C. C. Haws, J. L. Maiherae, and F. W. Miles. Aug 65, 169p
Contract W-7405-eng-26

Descriptors: (*Reactor system components, Material forming).

ORNL-3870 **Field 11B, 11F, 20L, 18L2**
CFSTI Prices: HC$7.00 MF$1.75
Oak Ridge National Lab., Tenn.
METALS AND CERAMICS DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING JUNE 30, 1965,
by Sigfred Peterson. Nov 65, 345p
Contract W-7405-eng-26

Descriptors: (*Materials, Scientific research).

Patent 3,219,474 **Field 11C, 11F**
PROTECTIVE COATINGS FOR COLUMBIUM AND ITS ALLOYS.
Patent assigned to AEC,
by Seymour Priceman and Lawrence Sama. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Niobium, Coatings), (*Niobium alloys, Protective treatments), (*Coatings, Niobium alloys), Aluminum coatings, Antioxidants, Titanium, Patents.

Columbium and its alloys are useful in nuclear applications. The coatings give oxidation resistance to the metals. The metals are coated by depositing a coating of titanium of predetermined thickness and then applying a coating of aluminum, preferably by pack calorizing.

Patent 3,219,477 **Field 11C, 11F**
OXIDATION RESISTANT COATINGS FOR COLUMBIUM AND COLUMBIUM ALLOYS.
Patent assigned to AEC,
by Joseph Grubessich and Lawrence Sama. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Niobium, Coatings), (*Niobium alloys, Protective treatments), (*Coatings, Niobium alloys), Aluminum, Tin, Aluminum coatings, Intermetallic compounds, Patents.

Columbium and columbium base alloys are protectively coated against oxidation in the 1100 to 1800 degrees F. range. Clean columbium is dipped for from two to sixty minutes in a molten bath of tin containing aluminum and minor amounts of other metals. The coated metal is then removed from the bath.

Patent 3,222,142 **Field 11B, 13H**
SYNTHESIS OF LARGE CRYSTALS FLUORPHLOGO- PITE MICA.
Patent assigned to Interior,
by Haskiel R. Shell, Norman A. Pace and Earl F.Nichols. 7 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Mica, Crystal growth), (*Crystal growth, Mica), (*Synthetic stones, Mica), Potassium compounds, Magnesium compounds, Aluminum compounds, Silicates, Fluorides, Crystallization, Single crystals, Patents.

Fluorphlogopite mica is crystallized from a liquid melt in a reaction vessel which is at an elevated temperature. The method involves rocking the vessel at a slow rate of motion while cooling the melt. Fluorphlogopite crystallizes out and the growing crystals are bathed in fresh liquid melt. The rocking motion is continued throughout the cooling and crystallization.

PAWC-355 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Pratt and Whitney Aircraft, Middletown, Conn. Advanced Nuclear Engineering Lab.
CORROSION OF COLUMBIUM BASE AND OTHER STRUCTURAL ALLOYS IN HIGH TEMPERATURE LITHIUM,
by M. S. Freed. 30 Jun 61, 35p
Contract AT (11-1)-229

Descriptors: (*Niobium alloys, Corrosion), (*Corrosion, High-temperature research).

PB-168 853 **Field 11I, 1C**
CFSTI Price: HC$4.00
General Mills, Inc., Minneapolis, Minn. Mechanical Div.
BALLOON BARRIER MATERIALS.
Final technical rept., 15 Mar 58-31 Oct 59,
by A. A. Anderson, Jr. and G. L. Morfitt. 30 Nov 59, 111p Rept. no. 1914
Contract AF19 (604)-3876,
Proj. 80074
AFCRC TR-60-204,
AD 232 878

Descriptors: (*Balloons, Materials), (*Plastics, Balloons), Polyester plastics, Polyethylene plastics, Films, Mechanical properties, Permeability, Degradation, Temperature, Stresses, Strain (Mechanics).

Accurate information is now available for both films at strain rates of 0.0004 to 0.25/in./in./sec. in the temperature range of ;30 to -70C. Poisson's ratio of Mylar film, based on width versus length strain, is dependent upon the degree of extension. A value of 0.37 was found for strains up to the yield point and 0.58 at larger extensions. The falling ball toughness of 0.0005, 0.001 and 0.002 inch Mylar film has been determined based on a statistical analysis of experimental results. Mylar A, C and D films have been shown to be nearly identical in the properties of yield stress and ultimate strength at both high and low temperature and strain rate. At 60C the photochemical degradation of Mylar film proceeds more slowly in the absence of oxygen than in air. Permeability of three gauges of Mylar A film to helium gas under conditions of reduced temperature (0 to - 75C) and differential pressure (1.0 to 7.5 cm Hg) has been determined. A comparison of the stress-strain curves determined for uncoated single strands of 1600 denier Fortisan with those obtained on polyethylene-coated double stands indicates the highly accurate information on Fortisan load tape behavior will be obtained only by testing the entire tape. (Author)

PB-169 102 **Field 11L, 20K**
CFSTI Prices: HC$1.00 MF$0.50
Forest Products Lab., Madison, Wis.
BUCKLING OF SIMPLY SUPPORTED PLYWOOD PLATES UNDER COMBINED EDGEWISE BENDING AND COMPRESSION.
Research paper,
by John J. Zahn and Karl M. Romstad. Dec 65, 23p FPL-50

Descriptors: (*Plywood, Buckling (Mechanics)), (*Buckling (Mechanics), Plywood), Flat plate models, Bending, Compressive properties, Loading (Mechanics), Mathematical analysis, Numberical analysis.

Theoretical buckling coefficients for simply supported, flat plywood plates under combined edgewise bending and compression are derived by treating plywood as an ortho-tropic plate. Curves of buckling coefficients are presented along with two examples of their use. (Author)

RFP-522 **Field 11F, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Kaman Nuclear, Colorado Springs, Colo.
AN AUTOMATIC SYSTEM FOR THE DETERMINATION OF OXYGEN IN BERYLLIUM METAL COMPONENTS,
by J. T. Byrne, C. T. Illsley, and H. J. Price. 1965, 25p CONF-650405-4
Contract AT (29-1)-1106
Prepared for presentation at International Conference on Modern Trends in Activation Analysis, College Station, Tex.

Descriptors: (*Beryllium, Non-destructive testing), (*Oxygen, Radioactivation analysis).

SC-DR-65-269 **Field 11C**
CFSTI Prices: HC$2.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
WEAR TESTING OF PLATED COATINGS,
by C. W. Jennings. Jul 65, 32p
Contract AT (29-1)-789

Descriptors: (*Wear resistance, Coatings), (*Coatings, Wear resistance).

TID-21513 **Field 11J**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
SPECIFICATION FOR THE PROCUREMENT, STORAGE, AND APPLICATION OF ROOM TEMPERATURE CURING SILICONE RUBBER, SILICONE RUBBER FOAMS, SILICONE PRIMERS, ADHESIVES AND SEALANTS,
by Harry F. Jensen. 11 Mar 60, 9p
Contract AT (45-1)-1350

Descriptors: (*Silicones, Material forming).

TID-21897 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Rutgers--The State Univ. of New Jersey, New Brunswick. Bureau of Engineering Research.
MECHANISM OF EROSION OF SOLID METALS.
Progress rept.
Apr 65, 17p
Contract AT (30-2)-3477

Descriptors: (*Metals, Corrosion), (*Corrosion, Metals).

TID-21918 **Field 11H, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Bridgeport Brass Co., Conn.
LUBRICATION STUDY OF URANIUM SURFACES. PHASE I.
Interim progress rept. no. 1,
by Q. C. Carloni. 1 Feb 62, 32p HAVENS-191
Contract AT (30-1)-1405

Descriptors: (*Lubricants, Uranium), (*Uranium, Surfaces).

TID-22007 **Field 11A**
CFSTI Prices: HC$1.00 MF$0.50
General Electric Co., Cincinnati, Ohio. Flight Propulsion Div.
NMPO BLOWER SHAFT SEAL TEST REPORT.
1963, 17p
Contract AT (40-1)-2847,
Proj. Stein Seal-2166
Subcontracted to Stein Seal Co., Philadelphia, Pa.
Contract NMPO-201.

Descriptors: (*Blowers, Seals), (*Seals, Shafts).

USBM-RC-1205 **Field 11F, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Mines, Albany, Oreg. Albany Metallurgy Research Center.
QUARTERLY METALLURGICAL PROGRESS REPORT NUMBER 28, AUGUST 1-September 30, 1965.
30 Sep 65, 19p
Contract AT (11-1)-699

Descriptors: (*Metallurgy, Reactor materials), (*Reactor materials, Metallurgy).

Y-DA-732 **Field 11F**
CFSTI Prices: HC$1.00 MF$0.50
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
TUNGSTEN POWDER METALLURGY IN THE PRODUCTION OF LARGE CRUCIBLES AND SUSCEPTORS,
by J. M. Googin, H. T. Greene, G. R. Guinn andA. C. Neeley. 29 Apr 65, 23p CONF-650531-1
Contract W-7405-eng-26
Prepared for presentation at International Powder Metallurgical Conference, New York., 14-17 Jun 1965.

Descriptors: (*Powder metallurgy, Tungsten), (*Crucibles, Production).

YALE-2560-5 **Field 11F**
CFSTI Prices: HC$2.00 MF$0.50
Yale Univ., New Haven, Conn.
ATOMIC DISTRIBUTION IN MOLTEN SILVER-TIN ALLOYS,
by M. L. Joshi and C. N. J. Wagner. Dec 64, 33p

Contract AT (30-1)-2560

Descriptors: (*Silver alloys, Tin alloys), (*X-ray diffraction analysis, Liquid metals).

12. MATHEMATICAL SCIENCES

ORNL-P-1303 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
TWO ALGORITHMS OF ROMBERG TYPE FOR ORDINARY INITIAL-VALUE PROBLEMS,
by William B. Gragg. 1964, 5p CONF-650505-3
Contract W-7405-eng-26
Presented at IFIP Congress 1965 Meeting, New York.

Descriptors: (*Boundary value problems, Algorithms), (*Algorithms, Boundary value problems).

PB-168 900 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Cornell Univ., Ithaca, N. Y.
GENERALIZED POSITIVE DEFINITE FUNCTIONS,
by C. S. Herz. 1959, 25p
Grant NSF-G18837

Descriptors: (*Distribution functions, Theory), Integral transforms, Probability.

PB-168 904 **Field 12B**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Graduate School of Business.
A FINITE RENEWAL ALGORITHM FOR THE KNAPSACK AND TURNPIKE MODELS,
by Jeremy F. Shapiro and Harvey M. Wagner. Nov 65, 41p Technical rept. TR-14
Grant NSF-G24064

Descriptors: (*Algorithms, Mathematical programming), (*Linear programming, Optimization), (*Dynamic programming, Optimization), Operations research.

Identifiers: Knapsack problem, Turnpike problem.

PB-168 906 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana.
SEQUENTIAL ESTIMATION OF A BINOMIAL PARAMETER,
by Madanlal T. Wasan. 1960, 41p
Grant NSF-G9104

Descriptors: (*Sequential analysis, Binomials), (*Binomials, Sequential analysis), Stochastic processes, Monte Carlo method.

PB-168 908 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Applied Mathematics and Statistics Labs.

EXTREMUM PROBLEMS FOR HARMONIC POLY- NOMIALS IN HIGHER EUCLIDEAN SPACES,
by Robert S. Dinsmore. 28 Jul 61, 29p Technical rept. TR-2
Grant NSF-G11296

Descriptors: (*Complex variables, Polynomials), (*Polynomials, Complex variables), Potential theory, Geometry.

PB-168 909 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana.
ADMISSIBLE AND MINIMAX ESTIMATES OF PARAMETERS IN TRUNCATED SPACES,
by Morris W. Katz. 1959, 39p
Grant NSF-G9104

Descriptors: (*Minimax technique, Statistical analysis), Binomials, Statistical distributions, Stochastic processes, Distribution functions.

PB-168 910 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana.
ON TEST EFFICIENCY AGAINST NORMAL ALTERNATIVES,
by Benjamin Henry McLemore, Jr. 1959, 26p

Grant NSF-G9104

Descriptors: (*Statistical tests, Effectiveness), Optimization.

PB-168 911 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.75
California Univ., Berkeley. Dept. of Mathematics.
E. CARTAN'S THEORY OF EXTERIOR DIFFERENTIAL SYSTEMS,
by Robert Hermann. Jan 63, 77p
Grant NSF-GP-2

Descriptors: (*Differential geometry, Theory), (*Partial differential equations, Differential geometry), Algebraic geometry.

Identifiers: Cartan's theory.

PB-168 913 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.50
Illinois Univ., Urbana.
EXISTENCE OF BOUNDED LENGTH CONFIDENCE INTERVALS,
by Rajinder Singh. 1960, 44p
Grant NSF-G9104

Descriptors: (*Statistical analysis, Decision theory), Stochastic processes, Sampling, Measure theory.

PB-168 915 **Field 12A, 13H**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Dept. of Statistics.
A BAYES SEQUENTIAL SAMPLING INSPECTION PLAN,
by Herman Chernoff and S. N. Ray. 15 Jun 64, 40p Technical rept. TR-4
Grant NSF-GP-2220

Descriptors: (*Sequential analysis, Quality control), (*Quality control, Sequential analysis), Costs, Optimization, Boundary value problems, Probability.

Identifiers: Bayes' solution.

PB-168 916 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Illinois Univ., Urbana.
SUCCESSIVE CONDITIONAL EXPECTATIONS OF AN INTEGRABLE FUNCTION,
by D. L. Burkholder. 1963, 15p
Grants NSF-G11382, NSF-G19667

Descriptors: (*Stochastic processes, Distribution functions), Measure theory, Operators (Mathematics).

PB-168 917 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.75
Michigan Univ., Ann Arbor.
CONNEXIONS IN PRINCIPAL FIBRE BUNDLES WITH GROUP GL (n (m),R).
Doctoral thesis,
by Arnold Seiken. 1963, 65p
Grant NSF-G10103

Descriptors: (*Algebraic topology, Groups (Mathematics)), Tensor analysis, Differential geometry, Matrix algebra.

This work studies properties of connections in a large class of principal fibre bundles and the reflection of these properties in the underlying base space.

PB-168 919 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Michigan State Univ., East Lansing. Dept. of Statistics.
METHOD OF DOUBLE SAMPLING FOR UNBIASED RATIO-TYPE ESTIMATORS,
by Balkrishna V. Sukhatme. 19 Apr 60, 20p RM-70, BVS-2
Grant NSF-G9660

Descriptors: (*Statistical analysis, Sampling), (*Sampling, Statistical analysis), Analysis of variance, Monte Carlo method.

PB-168 920 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Michigan State Univ., East Lansing. Dept. of Statistics.
POWER OF SOME TWO-SAMPLE NON-PARAMETRIC TESTS,
by Balkrishna V. Sukhatme. 1 Apr 60, 19p RM-68, BVS-1
Grant NSF-G9660

Descriptors: (*Statistical tests, Power).

Identifiers: Nonparametric statistics.

Rosenbaum and Kamat have proposed non-parametric tests for testing the hypothesis that two samples come from the samples come from the same population against the alternative that the Y's are more spread out than the X's and vice versa. This paper gives the exact distribution of the two test statistics under the alternative hypothesis and a discussion concerning the power of these two tests against scalar alternatives for small samples.

PB-168 922 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Michigan State Univ., East Lansing. Dept. of Statistics.
CONVERGENCE OF MEASURES DETERMINED BY A SEQUENCE OF POINTS,
by James H. Stapleton. Jan 61, 23p RM-84, JHS-1
Grant NSF-G9660

Descriptors: (*Measure theory, Sequences), Functional analysis, Topology, Matrix algebra.

PB-168 923 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
New Mexico State Univ., University Park. Dept. of Mathematics.
INTERNAL POINTS OF CONVEX SETS,
by Edward O. Thorp. 1959, 4p
Grant NSF-G25058

Descriptors: (*Convex sets, Topology), (*Topology, Convex sets).

PB-168 924 **Field 12A**
CFSTI Prices: HC$2.00 MF$0.75
Syracuse Univ., N. Y.
RATIO THEOREMS FOR RANDOM WALK,
by H. Kester and F. Spitzer. 1963, 47p
Grant NSF-G18837

Descriptors: (*Numerical analysis, Stochastic processes).

PB-168 925 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
New Mexico State Univ., University Park. Dept. of Mathematics.
REPEATED INDEPENDENT TRIALS AND A CLASS OF DICE PROBLEMS,
by Edward O. Thorp. 1962, 7p
Grant NSF-G25058

Descriptors: (*Game theory, Probability).

PB-168 926 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
New Mexico State Univ., University Park. Dept. of Mathematics.
THE RANGE AS RANGE SPACE FOR COMPACE OPERATORS II,
by Edward O. Thorp. 1963, 16p
Grant NSF-G25058

Descriptors: (*Operators (Mathematics), Topology), Functional analysis.

PB-168 927 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
New Mexico State Univ., University Park. Dept. of Mathematics.
TWO CHARACTERIZATIONS OF FINITE DIMENSIONAL NORMED LINEAR SPACES,
by Edward O. Thorp and Elton Lacey. 1963, 4p
Grant NSF-G25058

Descriptors: (*Functional analysis, Topology), Operators (Mathematics).

PB-168 928 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
New Mexico State Univ., University Park. Dept. of Mathematics.
FINITE DIMENSIONAL NORMED SPACES,
by Edward O. Thorp. 1959, 6p
Grant NSF-G25058

Descriptors: (*Functional analysis, Topology), Operators (Mathematics).

PB-168 929 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
New Mexico State Univ., University Park. Dept. of Mathematics.
SOME BANACH SPACES CONGRUENT TO THEIR CONJUGATES,
by Edward O. Thorp. 1962, 6p
Grant NSF-G25058

Descriptors: (*Functional analysis, Theorems).

UCRL-11921 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.
ANALYTICITY AS A FUNDAMENTAL PRINCIPLE IN PHYSICS,
by Geoffrey F. Chew. 26 Jan 65, 19p CONF-640915-1
Contract W-7405-eng-48
Presented at Pisa Symposium on Natural Philosophy, Pisa., 1964.

Descriptors: (*Taylor's series, Physics).

UCRL-12050 Field 12A
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
DETERMINATION OF ERRORS IN A ONE-PARAMETER SYSTEM,
by R. Schroeder. 28 Aug 64, 9p
Contract W-7405-eng-48

Descriptors: (*Curve fitting, Errors), (*Errors, Determination).

UCRL-14177 Field 12A, 9B
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
FORMULA MANIPULATION CODE FOR THE CALCULATION OF CHRISTOFFEL SYMBOLS,
by John J. Walton. 5 May 65, 41p
Contract W-7405-eng-48

Descriptors: (*Tensor analysis, Programming (Computers)), (*Programming (Computers), Tensor analysis).

UCRL-14228 Field 12A, 9D, 20D
CFSTI Prices: HC$4.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Livermore.
A NUMERICAL CALCULATION OF TWO -DIMENSIONAL STEADY-STATE DETONATIONS BY THE METHOD OF CHARACTERISTICS,
by Gerald T. Richarde. 26 May 65, 107p
Contract W-7405-eng-48

Descriptors: (*Detonations, Numerical analysis), (*Numerical analysis, Detonations).

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

AD-439 950 Field 13I, 22B
CFSTI Prices: HC$4.00
Martin Co., Baltimore, Md. Advanced Logistics Dept.
SPACE POWER TOOL.
Final rept. 24 Jun-31 Oct,
by Flody K. Daisey. Apr 64, 107p
Contract AF33 (657)-11734,
Proj. AF-8170,
Task 817008
RTD TDR-4227

Descriptors: (*Space tools, Power equipment), Friction, Feasibility studies, Torque, Impact wrenchs, Space environmental conditions, Drills, Wrenches, Space maint.

The final configuration tool, delivered to the Air Force, meets or exceeds all of the pre-established design and operational requirements. High altitude brushes and low operating voltages allow satisfactory operation in a vacuum. Nickel cadmium battery cells housed in the tool handle provide portable operation and give the tool ability to tighten over 150-3/8 inch bolts to nearly 400 inch pounds of torque. A major achievement was made in the area of reduction of reaction torque reflected to the operator. A unique approach of directing reaction-torque back to the fastener, minimized this to a phenomenally low value of .9 in. oz. Furthermore, the principle on which the tool operates will allow, through very minor modification, this value of .9 in. oz. to be reduced to zero. It is therefore permissible, with reference to the operator, to refer to this tool as truly a zero reaction rather than minimum reaction device. Finally, it can be stated that portable, electric tools, producing reasonable output torque and providing minimum or zero reaction are practical, and offer a promising solution to the problems inherent in performing maintenance functions in a zero or minimum "G" environment. Further work remains to be accomplished, however, in the areas of reducing tool weight and increasing tool performance.

AD-458 314 Field 13M
CFSTI Price: HC$5.00
IIT Research Inst., Chicago, Ill. Technology Center.
STRUCTURAL COST STUDIES FOR HARDENED SHELTERS (500-MAN AND 1000-MAN CAPACITIES).
Final rept.,
by John A. Havers and Jerry J. Lukes. Jan 65, 195p
Contract OCD-PS-64-50,
Proj. IITRI M6064 (1),
Task 1152E

Descriptors: (*Shelters, Costs), Underground structures, Civilian defense systems, Structural properties, Design, Configuration, Optimization, Determination, Construction, Materials, Steel, Concrete, Wood, Reinforced concrete, Hardening.

Applying the cost and design relationships developed earlier (AD-429 134), the in-place structural costs of 500-man and 1000-man capacity fully-buried shelters were identified as functions of structural material, structural system, shelter configuration, and design level of loading. By combining the optima of these designs, minimum-structural-cost relationships were developed for 100-man, 500-man and 1000-man capacity shelters as functions of overpressure level. The range of interest, included 10 psi to 200 psi overpressures produced by nuclear yields of one MT to 100 MT. Once design overpressures have increased to some unspecified level, the absolute magnitude of which decreases as shelter design capacity is increased, it is found that per occupant structural costs are relatively insensitive to increasing overpressure. It is also found that structural per occupant costs may decrease appreciably, although at a decreasing rate, as shelter design capacity is increased. Finally, the economic importance of identifying the minimum-cost structural design for each proposed shelter application is emphasized. (Author)

AD-461 826 Field 13H
CFSTI Price: HC$2.00
Battelle Memorial Inst., Columbus, Ohio.
A SURVEY OF ELECTROFORMING FOR FABRICATING STRUCTURES.
Revised ed.,
by W. H. Safranek. Oct 64, 46p
Contract DA-01-021-AMC-203 (Z)
RSIC 210
Revision of Aug 1964 edition.

Descriptors: (*Electroforming, State-of-the-art reviews), Tables, Nickel, Structural properties, Fatigue (Mechanics), Stresses, Permeability, Density, Tensile propetties, Copper, Iron, Nickel alloys, Cobalt alloys, Manganese alloys, Chromium, Chromium alloys, Tungsten alloys, Refractory metals, Silver, Gold, Rhodium, Aluminum, Mechanical properties, Welds.

Several high-strength structures have been produced by electroforming, for specific missile and aerospace applications. Several organizations have electroformed nickel with ultimate tensile strengths of 90,000 to 100,000 psi, or more. Touch (notch insensitive), 200,000-psi nickel has been electroformed by one or two organizations, but additional information must be developed before such a high strength material can be electroformed consistently in a complexly shaped form. This state-of-the-art report describes advantages and limitations of electroforming, summarizes available property data of materials, and discusses electroforming conditions that must be maintained for good control of structural properties. (Author)

AD-465 991 Field 13H, 13I, 11F
CFSTI Prices: HC$3.00 MF$0.75
IIT Research Inst., Chicago, Ill. Technology Center.
INTERFACE FRICTION IN HOT METAL DEFORMATION.
Final rept., 23 May 64-23 May 65,
by J. A. Schey and F. A. Shunk. 11 Jun 65, 79p
IITRI-B6027-6
Contract NOw-0458-f

Descriptors: (*Hot working, Friction), (*Alloys, Hot working), (*Beryllium, Hot working), (*Deformation, Surface properties, Aluminum alloys, Titanium alloys, Steel, Molybdenum alloys, Nickel alloys, Chromium alloys, Iron alloys, Carbon alloys, Zirconium alloys, Dies, Tool steel, Tungsten compounds, Carbides, Aluminum compounds, Oxides, Stresses, Material forming, Lubrication.

Identifiers: Aluminum alloy 7075, Titanium alloy 6Al4V, Steel 4130, Molybdenum alloy TZM, Inconel alloy X750.

An investigation was carried out on interface friction between workpiece and die material under conditions of hot plastic deformation. The plane-strain compression technique was used for determining the magnitude of friction between 7075 Al, Ti-6Al-4V, 4130 steel, TZM, Inconel X750 and Be specimens (representing the workpiece) and 4340, H- 11, WC and Al2O3 anvils (representing the die). Calculated coefficients of friction, combined with observations of surface appearance, showed that sticking friction is the dominating mechanism. Sliding friction was promoted by some oxides formed on specimens and, possibly, by some surface treatments applied to anvils. (Author)

AD-466 062 Field 13J
CFSTI Prices: HC$1.00 MF$0.50
Army Engineer Research and Development Labs., Fort Belvoir, Va.
ENGINEER DESIGN TEST OF RETRACTOR RAM FOR PROTOTYPE BEACH DISCHARGE LIGHTER.
Rept. for 22-26 Mar 65,
by Richard W. Helmke. Jun 65, 20p Rept. no. 1811
Task 1M443012D25611

Descriptors: (*Landing craft, Hydraulic jacks), (*Hydraulic jacks, Design), Tests, Yard craft, Effectiveness, Soil mechanics, Beaches.

Identifiers: BDL-1X.

The report covers the engineer design test of a retractor ram installed in the U. S. Army beach discharge lighter Lt. Col. John U. D. Page (BDL-1X). The purpose of the test was to evaluate the effectiveness of the ram in beach retraction. Report concludes: (a) The bearing area of the ram pad is not adequate for effective use in soil conditions such as those encountered on the beaches at Fort Story and Little Creek, Virginia; (b) the stroke of the ram is not adequate when the BDL-1X grounds aft of the ram pad on sand bars of the type encountered at Little Creek; (c) the value of the ram was not evident during the beach retractions carried out under this test. (Author)

AD-466 568 Field 13M
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Reclamation, Denver, Colo. Hydraulics Branch.
RESEARCH STUDY ON STILLING BASINS, ENERGY DISSIPATORS, AND ASSOCIATED APPURTENANCES, SECTION 13. STILLING BASINS FOR HIGH HEAD OUTLET WORKS WITH SLIDE-GATE CONTROL (PRELIMINARY STUDIES).
Progress rept. no. 7.
1 May 65, 43p Hyd-544

Descriptors: (*Dams, Hydraulic accumulators), Civil engineering, Ducts, Gate valves, Hydraulic models, Model tests, Structures, Turbulence, Pressure, Design, Water.

The purpose of these studies was to develop an efficient, economical stilling basin for use with slide gate control for high-head outlet works. De-

sign curves were developed for a rectangular plunge basin to determine basin depth and length, height of the gate above the basin floor, and magnitude of impact heads on the basin floor. Comparisons were made with corresponding basins of the hydraulic jump type designed according to Engineering Monograph 25. Tentative design curves were obtained for the hydraulic jump basin based on data derived from general model studies of four particular stilling basins. Recommendations for continuing work in this study are presented. (Author)

AD-466 570 **Field 13B, 8H**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Reclamation, Denver, Colo.
SEDIMENT TESTS ON PROTOTYPE DIVERSION DAMS, KANSAS RIVER BASIN, KANSAS-NEBRASKA.
Interim rept.,
by Ernest L. Pemberton and Enos J. Carlson. Dec 64, 49p HYD-550

Descriptors: (*Sedimentation, Dams), (*Dams, Sedimentation), Rivers, Kansas, Nebraska, Hydraulic models, Silt, Volume, Civil engineering.

Field tests were conducted at Woodston, Bartley, and Superior-Courtland Diversion Dams in the Kansas River Basin during August 1960 to determine the efficiencies of sediment control structures for excluding sediment from the canal system. Data were also obtained at Cambridge Diversion Dam where a sediment problem existed but the dam had no sediment control structure. Sediment samples and hydraulic data were collected for computing the amount of sediment transported in the rivers and the amount of sediment transported through the sluiceway and canal at the headworks of each diversion dam. At Woodston, Bartley, and Superior-Courtland Diversion Dams where curved guide walls were used as a sediment control structure, the sand load of the river was depositing in the river basin above the diversion dam at the time of the tests. Very little sand was entering the guide walls at the canal headworks which did not permit a quantitative evaluation of the amount of sand excluded from entering the canal. However, the operating personnel are extremely satisfied with the curved guide walls. The curved guide walls provide an efficient means for flushing sediments deposited above the dam into the downstream river channel either by continuous sluicing or by intermittent sluicing. (Author)

AD-467 052 **Field 13A, 20M**
CFSTI Prices: HC$3.00 MF$0.75
Naval Postgraduate School, Monterey, Calif.
HEAT TRANSFER AND FLOW FRICTION CHARACTERISTICS OF PERFORATED NICKEL PLATE-FIN TYPE HEAT TRANSFER SURFACES.
Technical rept., Jan 64-Jun 65,
by J. M. Bannon, C. H. Piersall, Jr. and P. F. Pucci. 30 Jun 65, 92p USNPGS-TR-52

Descriptors: (*Heat transfer, Surfaces), (*Friction, Surfaces), (*Heat exchangers, Heat transfer), Convection (Heat transfer), Nickel, Fins.

Experimental results for the convective heat transfer and flow friction characteristics of plate-fin type heat transfer surfaces are presented for eight surfaces. Six surfaces were fabricated of perforated nickel plate, one perforated nickel fins with solid nickel plate splitters and one of solid nickel plate. The heat transfer data were obtained by the transient technique and includes the effect of longitudinal conduction. (Author)

AD-468 203 **Field 13H, 11D**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Philadelphia, Pa. Missile and Space Div.
INVESTIGATION OF BONDING IN OXIDE-FIBER (WHISKER) REINFORCED METALS.
Quarterly rept. no. 3, 1 Jan-31 Mar 65,
by Williard H. Sutton. 31 Mar 65, 27p
Contract DA-19-066-AMC-184 (X),
Proj. DA-1A024401A110
AMRA CR-65-01/3

Descriptors: (*Ceramic fibers, Reinforcing materials), (*Composite materials, Bonding), (*Fiber metallurgy, Composite materials), Sapphires, Aluminum compounds, Oxides, Zirconium, Nickel, Titanium, Chromium, Single crystals, Whiskers (Crystallography), Vacuum, Shear stresses, Surface properties, Additives, Microstructure, Fracture (Mechanics).

The effect of specific trace elements on the bonding of nickel to single crystal sapphire (alpha-Al2O3) was investigated. Sessile drop experiments were conducted in vacuo (0.000005 Torr) at 1485 C plus or minus 10C. In previous experiments, the addition of 1 a/o (about 10,000 ppm) Zr, Ti, and Cr to nickel was found to have distinct, but different effects, on the interfacial microstructure and the room-temperature bond strength between Ni and Al2O3. The present studies have been concerned with the same additives, but at much lower concentrations, viz., about 800 ppm and about 20 ppm. Even at these low concentrations, the same types of interfacial microstructures and fracture modes, which were characteristic for the specimens containing 10,000 ppm Cr, Ti, and Zr, were observed. (Author)

BDX-613-14 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
Bendix Corp., Kansas City, Mo.
ULTRASONIC SPOT WELD EVALUATION,
by D. W. Drayer. Mar 61, 10p
Contract AT (29-1)-613
Presented at Non-Destructive Testing Society, Kansas City, Mo., May 1961.

Descriptors: (*Spot welds, Ultrasonic radiation), (*Ultrasonic radiation, Spot welds).

BNWL-116 **Field 13D**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PRESSURIZING VESSEL PERFORMANCE EQUATIONS,
by K. D. Coughren. Aug 65, 32p
Contract AT (46-1)-1830

Descriptors: (*Pressure vessels, Performance (Engineering)), (*Performance (Engineering), Equations).

GEAP-4847 **Field 13H**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
RADIAL VANE STEAM SEPARATOR DEVELOPMENT.
Quarterly rept. no. 3, Jan-Mar 65,
by R. H. Moen. Apr 65, 84p EURAEC-1365
Contract AT (04-3)-189

Descriptors: (*Steam, Separation), (*Test reactors, Steam).

IS-1184 **Field 13H**
CFSTI Prices: HC$2.00 MF$0.50
Ames Lab., Iowa State Univ. of Science and Tech.
A UNIVERSAL ELECTROPOLISHING METHOD,
by E. N. Hopkins, D. T. Peterson, and H. H. Baker.
21 Jun 65, 30p CONF-650414-3
Contract W-7405-eng-42
Presented at (19th) Metallographic Group Meeting, Oak Ridge, Tenn., 20-22 Apr 1965.

Descriptors: (*Electrolytic polishing, Metals).

MLM-1284 **Field 13H, 7C**
CFSTI Prices: HC$1.00 MF$0.50
Mound Lab., Miamisburg, Ohio.
DETERMINATION OF TERTIARY BUTYL PERBENZOATE IN MOLDING POWDERS,
by L. W. Hartzel. 1 Jul 65. 4p
Contract AT (33-1)-GEN-5318

Descriptors: (*Molding materials, Benzoates), (*Benzoates, Powders).

NAA-SR-11198 **Field18N, 13K**
CFSTI Prices: HC$3.00 MF$0.75
Atomics International, Canoga Park, Calif.
DEVELOPMENT OF THE THERMOELECTROMAGNETIC PUMP FOR THE 3-KWE MERCURY RANKINE SYSTEM,
by H. H. Hanlin. 1 Sep 65, 69p
Contract AT (11-1)-GEN-8

Descriptors: (*Liquid metal pumps, Spacecraft), (*Liquid metal cooled reactors, Auxilary power plants).

NYO-3029-2 **Field 13I**
CFSTI Prices: HC$1.00 MF$0.50
Cornell Univ., Ithaca, N. Y. Materials Science Center.
SOME COMMENTS ON ACID-SAW TECHNIQUES,
by R. H. Geiss, W. G. Lehmann, andM. Meistrich. 11 Dec 64, 17p NYO-3087-2, 295
Contract AT (30-1)-3029

Descriptors: (*Saws, Acids), (*Acids, Saws).

ORNL-3613 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
THE JOINT NATIONAL INSTITUTES OF HEALTH- ATOMIC ENERGY COMMISSION ZONAL CENTRIFUGATION PROJECT. I. THE DEVELOPMENT OF LOW-SPEED ZONAL ROTORS,
by N. G. Anderson, H. P. Barringer, C. E. Nunley, R. E. Canning and C. L. Burger. Oct 64, 18p
Contract W-7405-eng-26

Descriptors: (*Centrifuges, Rotor blades (Turbomachinery)).

Patent 3,219,048 **Field 13K**
VORTEX FLOW CONTROL VALVE.
Patent assigned to Army,
by Rosso R. Palmisano. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Valves, Vortices), Control, Diffusers, Fluid flow, Vacuum, Pressure, Patents.

The valve has no moving parts. Fluid is introduced at an input port where vortical motion is imparted to the fluid. Radially displaced from the input is a vortical outlet orifice, which forms the throat of a diffuser section. The valve outlet is a continuation of this diffuser section. Axially aligned with the vortex outlet orifice, and on the side away from the diffuser section, is a relief port. When a fluid is introduced at the input it will exit at the output. When the rate of fluid input exceeds the capability of the output to accommodate the uid flow, the excess fluid flows out of the relief port.

Patent 3,219,147 **Field 13I, 19G**
TORQUE AMPLIFIER.
Patent assigned to Army,
by Alfred F. Teitscheid and Clifford R. Daly. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Servomechanisms, Control), (*Rockets, Servomechanisms), Timing devices, Drives, Patents.

The mechanical torque amplifier has a control me-

chanism or timing movement. The entire arrangement is particularly useful in rocket apparatus. The mechanism has a mechanical power spring for driving a load to be supported on an output shaft, a power drum connected to the spring and driving a control shaft to which speed controls are geared, and a control band within and adjacent the drum, the band having one end connected to the control shaft and another end connected to the output shaft.

Patent 3,219,250 **Field 13H**
FLEXIBLE BACK-UP BAR.
Patent assigned to NASA,
by Aubrey S. Drummond. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Welding, Positioning devices (Machinery)), (*Positioning devices (Machinery), Welding), Cylindrical bodies, Patents.

The back-up bar is for use in welding cylindrical or other awkward shaped structures. A plurality of thin plates are contiguously arranged in a face-to-face relationship and form with their outer orientated edges a backup contact surface which is to be pressed against the surfaces of the structures to be joined at opposite sides of the seam or joint. The thin plates are held in their laminated position by an elastomeric ribbon member to which the inner orientated edges of the thin plates are secured. The outer edge of each plate may have a center groove or mold which receives the molten metal from the seam joint during the welding operations to form a bead along the underside of the weld.

Patent 3,219,304 **Field 13I**
TWO AXIS LEVELING DEVICE.
Patent assigned to Army,
by Edgar P. Freer. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Positioning devices (Machinery), Joints), (*Joints, Positioning devices (Machinery)), Gimbals, Gears, Patents.

The leveling device is for leveling an instrument when mounted on a platform of the device. It is in effect a ball socket that is always locked in position. The structure includes a fixed base head and a movable gimbal heat that are interconnected by a mechanical gear adjusting arrangement.

Patent 3,219,365 **Field 13E**
SPHERICAL SHIELD.
Patent assigned to NASA,
by Sheldon J. Noreen and Robert O. Pfleger. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Protective coverings, Flexible couplings), (*Flexible couplings, Protective coverings), Pipes, Joints, Flanges, Patents.

The shield device is for a bellows joint. It protects the bellows against scratches and dents. The bellows are placed at the joints in conduits carrying high pressure fluids, such as propellants. The shield device consists of a sleeve surrounding the bellows joint and supported by the joined conduit section to provide a ball joint action for each conduit section.

Patent 3,221,501 **Field 13G**
POWER MATCHED HYDRAULIC SERVO-SYSTEM.
Patent assigned to Navy,
by Woodrow Seamone and Loran A. Wenrich. 7 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Hydraulic servomechanisms, Design), Hydraulic pressure pumps, Power, Optimization, Patents, Guided missile components, Spacecraft components.

The hydraulic servo system is used in a missile or satellite. A variable load sensing control valve is utilized in the system. It is controlled by differential pressure and serves by use of a variable orifice to regulate fluid flow, thereby regulating the supply pressure. The system is called a 'power matched' system, refering to the matching of the output pressures of the pump with the actual pressure requirements of the servo-valve.

Patent 3,222,195 **Field 13H**
STABILIZED ELECTROLESS COPPER SOLUTION.
Patent assigned to Army,
by Fred Pearlstein. 7 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Copper coatings, Electroless plating), (*Electroless plating, Copper), Solutions, Stabilization, Sodium compounds, Potassium compounds, Tartrates, Hydroxide, Thiazoles, Thiols, Aromatic compounds, Formaldehyde, Patents.

Identifiers: Benzothiazole thiols, Fehling's solution.

The electroless copper plating solution contains Fehling's solution, a reducing agent such as formaldehyde and a stabilizing amount of 2-mercaptobenzothiazole. The solution is more stable than prior solutions.

Patent 3,225,780 **Field 13G**
PRESSURE RECOVERY FROM BISTABLE ELEMENT.
Patent assigned to Army,
by Raymond W. Warren, Ralph G. Barclay, and John G. Moorhead. 28 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Fluid amplifiers, Control systems), Pressure, Recovery, Fluid flow, Patents, Ducts, Configuration.

The self adaptive fluid system incorporates a pure fluid amplifier. The system provides maximum pressure or flow when maximum pressure or flow are respectively required at the output load, and is designed to effect an impedance match between the load device and the pure fluid amplifier incorporated in the system by the novel duct configuration.

Patent 3,226,505 **Field 13G**
FLUID FLOW INTERLOCK.
Patent assigned to AEC,
by Luther R. Lucas and Claire E. Miner. 28 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Fluid flow, Instrumentation), Cooling, Control systems, Particle accelerators, Nuclear reactors, Patents.

The mechanism provides an alarm, control activation, or automatic shutdown of equipment upon a reduction of fluid flow through a system. The coolant systems of charged particle accelerators and nuclear reactors require such mechanism or interlocks. The structure includes a flexible diaphragm which responds to a pressure differential established by the flow. The diaphragm moves against the flow under normal flow conditions.

PB-168 747 **Field 13M, 9B**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Public Roads, Washington, D. C.
ELECTRONIC COMPUTER PROGRAM FOR ANALYSIS AND DESIGN OF WELDED STEEL GIRDERS,
by G. Yee and W. H. Collins. May 64, 36p BPR Program-ST-9

Descriptors: (*Beams (Structural), Steel), (*Programming (Computers), Beams (Structural)), Design, Analysis, Welds, Structural properties, Programming languages, Reinforcing materials, Bridges, Stresses.

A program was developed to design welded steel girders in accordance with the 1961 American Association of State Highway Officials Standard Design Specifications for Highway Bridges. For a given span length, beam spacing, concrete slab thickness, and a loading specification, the program will determine: (1) the steel sections at various points along the beam, and (2) the magnitude of the maximum stress applied to the beam material when it is resisting applied loads. The original program was developed in FORTRAN, a problem oriented computer language, for the IBM 1410 Data Processing System. The FORTRAN program statements are furnished in the program documentation in place of the usual block diagram. (Author)

PB-168 978 **Field 13B**
CFSTI Prices: HC$3.00 MF$0.50
Delaware Univ., Newark.
COST OF PURIFYING MUNICIPAL WASTE WATERS BY DISTILLATION,
by J. A. Gerster. Nov 63, 51p
AWTR 6,
PHS Pub-999-WP-6
Environmental Health Series. Water Supply and Pollution Control.

Descriptors: (*Water pollution, Public health), (*Water supplies, Purification), (*Wastes (Sanitary engineering), Distillation), Costs, Sea water, Contamination, Boiling point, Evaporation, Temperature.

Desk top studies of the cost of distillation of waste water are made with the types of equipment proposed for use with sea water. The estimates are based upon those for sea water, but are modified to conform with the differences in composition of sea water and waste water, and differences in the modes of operation for the two feeds. The smaller concentration of scaling materials in waste water should allow distillation to be carried out at a higher temperature than can be used with sea water. The smaller total contaminant concentration results in a smaller boiling-point elevation. Because of the need to dispose of the blowdown permanently it is necessary to concentrate to a far greater extent than in the case of sea-water distillation. Three types of equipment: Multi-stage flash, multiple-effect, and recompression-flash, appear economically promising. For all types of equipment the cost for the distillation step alone is somewhat less than for sea water, but inclusion of costs for feed pretreatment and ultimate disposal of blowdown, bring the cost up to about that for sea water. (Author)

PB-168 979 **Field 13B**
CFSTI Prices: HC$2.00 MF$0.50
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
EXTENDED-AERATION PLANTS AND INTERMITTENT WATERCOURSES,
by Grover L. Morris, Lowell Van Den Berg, Gordon L. Culp, Jack R. Geckler, and Ralph Porges. Jul 63, 50p
PHS Pub-999-WP-8
Rept. on Environmental Health Series. Water Supply and Pollution Control.

Descriptors: (*Water pollution, Public health), (*Sewage, Water pollution), (*Hydrology, Water pollution), Degradation, Solids, Wastes (Sanitary engineering), Algae, Aquatic animals, Inland waterways, Tables, Costs.

Two basic extended-aeration plants that discharge effluents to intermittent watercourses were studied during various seasons of the year. Except for periods of slug discharges, the plants produced effluents with a BOD of less than 35 mg/l and suspended solids less than 30 mg/l. Plant efficiency was directly related to the amount of solids lost as a result of fluctuations in raw waste flow or as a result of denitrification and rising of solids in the sedimentation basin and consequent overflow. With the addition of sludge-wasting facilities of effluent-polishing units, these plants would be capable of efficient continuous operation for long

periods. Periodic heavy discharges of suspended solids formed sludge deposits in the two streams receiving effluent from the plants. Counts of benthic forms above and below the plant outfalls and at sampling points downstream clearly showed the effect of these deposits. Algal growths were profuse in unshaded portions of the streams, indicating high nutrient levels. (Author)

PB-169 185 **Field 13I, 8I**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Mines, Washington, D. C.
NOISE FROM PNEUMATIC ROCK DRILLS. ANALOGY STUDIES OF MUFFLER DESIGNS.
Rept. of investigations,
by R. T. DeWoody, J. W. Chester and W. C. Miller. 1964, 28p RI-6345

Descriptors: (*Pnuematic devices, Noise), (*Noise, Attenuation), Drills, Rocks (Geology), Design, Electrical properties, Simulation.

The work was done to develop a relatively efficient muffler for quieting the exhaust of a rock drill. The exhaust of a pneumatic rock drill is the source of the major part of the noise generated by the drill. The exhaust noise can be reduced in a number of different ways, but this study involved only reactive mufflers. The reactive muffler can be simulated by an electrical circuit. Information obtained from analogous electrical circuits was used to design an efficient exhaust muffler for pneumatic rock drills. Electrical analogies proved to be a valuable tool in the design of mufflers. (Author)

PB-169 214 **Field 13F**
CFSTI Prices: HC$4.00 MF$0.75
Maryland Univ., College Park.
THE NORTHEAST CORRIDOR REGION: MAIN LINE RAIL PASSENGER SERVICE IN THE SOUTHERN SECTION, 1947-1963,
by George M. Smerk. 1963, 125p
Research performed for Office of the Under Secretary of Commerce for Transportation, Washington, D. C.

Descriptors: (*Railroads, Traffic), Transportation, Population, Volume, Statistical data, New York, New Jersey, Delaware, Maryland, Pennsylvania.

The Northeast Corridor region of the United States, often referred to in recent times as Megalopolis, is that portion of the country lying along the eastern seaboard which stretches in a northeasterly direction from the northern counties of Virginia in the Washington, D. C., Metropolitan Area, to several counties in the southeastern portion of the state of New Hampshire. The focus of this study is confined to main-line rail passenger service in the southern section of the Northeast Corridor. That is, to be more precise, the area south from New York City to Washington, D. C., and west to Harrisburg, Pennsylvania.

PB-169 239 **Field 13J**
CFSTI Prices: HC$2.00 MF$0.50
Maritime Administration, Washington, D. C.
CLASSIFICATION OF WEIGHTS. STANDARD GROUPING FOR MERCHANT SHIPS.
Revised ed.
Jul 62, 47p

Descriptors: (*Weight classification), (*Merchant vessels, Weight), Steel, Ship structural components, Ship auxiliary equipment, Marine engineering, Nuclear propulsion, Standards.

The weight classification system presented in this volume is a revision of the Maritime Commission system published under a similar title in July 1940. This system is now in general use among merchant ship designers and builders in the United States. No basic changes have been made in the classification system but descriptions have been clarified and enlarged to include new equipment and materials now common in the industry. The copious, cross-referenced index has been expanded to include these new items and now generally encompasses by common name every item of equipment and material found on a modern merchant vessel. The system comprises three major groupings: Steel-Groups 0-0 to 9-9, Outfit-Groups 10-0 to 19-9, Machinery-Groups 20-0 to 29-9, The major groupings encompass all of the light ship weight which is further defined as follows: The light ship weight shall be the weight of the ship with all its equipment and outfit, including permanent ballast (solid and liquid), spare parts, regardless of by whom furnished, water in boilers to normal steaming level, machinery in working condition, lubricating oil in all machinery, but not in storage tanks, water in piping systems in the machinery spaces, water in fresh water systems and firemains, but without any items of consumable or variable load, as liquids in double bottom tanks, deep tanks, storage or reserve supply tanks or any allowance for cargo, stores, passengers, crew and their effects. (Author)

RFP-562 **Field 13I**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
AN EVALUATION OF ADJUSTABLE SPEED DRIVE SYSTEMS ON MACHINE TOOLS,
by L. W. Utley. 26 Aug 65, 14p
Contract AT (29-1)-1106

Descriptors: (*Machine tools, Drives), (*Drives, Machine tools).

SC-R-65-888 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
CONTAMINATION CONTROL CONSIDERATIONS FOR DESIGNERS AND MANUFACTURING ENGINEERS.
by D. W. Ballard. Apr 65, 9p CONF-735-2
Contract AT (29-1)-789
Presented at National Meeting of the American Association for Contamination Control, Los Angeles, May 1964.

Descriptors: (*Contamination, Control).

TID-20625 (vol. 2) (rev. 1) **Field 13H**
CFSTI Prices: HC$6.00 MF$1.50
Hanford Atomic Products Operation, Richland, Wash.
WELDING PROCEDURES. VOLUME II. PROCEDURE SPECIFICATIONS, WELDING PROCEDURES, AND PROCEDURE QUALIFICATION TEST RECORDS (HWS-7173 THROUGH HWS-7177 SERIES).
1964, 287p

Descriptors: (*Welding, Specifications).

TID-20625 (vol. 3) (rev. 1) **Field 13H**
CFSTI Prices: HC$6.00 MF$1.50
Hanford Atomic Products Operation, Richland, Wash.
WELDING PROCEDURES. VOLUME III. PROCEDURE SPECIFICATIONS, WELDING PROCEDURES, AND PROCEDURE QUALIFICATION TEST RECORDS (HWS-7178 THROUGH HWS-7191 SERIES).
1964, 282p

Descriptors: (*Welding, Specifications).

TID-22025 **Field 13I**
CFSTI Prices: HC$3.00 MF$0.75
Columbia Univ., New York. School of Engineering and Applied Science.
EQUILIBRIUM CHARACTERISTICS OF AXIAL GROOVE GAS LUBRICATED BEARINGS.
Lubrication research laboratory rept. no. 1,
by V. Castelli and J. Pirvics. 1964, 72p
Contract Nonr-266- (88),
Task NR-062-298

Descriptors: (*Gas bearings, Mechanical properties).

TID-7677 **Field 13B**
CFSTI Prices: HC$7.00 MF$3.50
Johns Hopkins Univ., Baltimore, Md. Dept. of Sanitary Engineering and Water Resources.
AEC AIR CLEANING CONFERENCE, HELD AT OAK RIDGE NATIONAL LABORATORY, OCT. 22-25, 1963,
ed. by B. H. Kornegay, D. K. Jamison, and J. M. Morgan, Jr. Oct 63, 852p
Contract AT (30-1)-1477
Legibility of this document is in part unsatisfactory. Reproduction has been made from best available copy. A portion of the original document contains fine detail which may make reading of photocopy difficult.

Descriptors: (*Air pollution, Cleaning), (*Gases, Cleaning), (*Cleaning, Symposia).

TIM-948 **Field 13A, 7A, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Pratt and Whitney Aircraft, Middletown, Conn. Conn. Advanced Nuclear Engineering Lab.
A COMPACT 1900F RESISTANCE-WOUND COMBUSTION FURNACE FOR REMOTE OPERATION,
by D. R. Farmelo. 23 Jul 65, 7p
Contract AT (30-1)-2789

Descriptors: (*Furnaces, Refractory metals), (*Remote control systems, Furnaces).

UCRL-13100 **Field 13H, 7A**
CFSTI Prices: HC$1.00 MF$0.50
Ethyl Corp., Baton Rouge, La. Research and Development Dept.
INVESTIGATION OF CHEMICAL VAPOR DEPOSITION OF BERYLLIUM FROM ORGANO-BERYLLIUM COMPOUNDS.
Final rept., Jun 63-Jan 64,
by J. M. Wood, J. B. Chidester, and E. Dyble.
1964, 21p
ontract W-7405-eng-48

Descriptors: (*Vapor plating, Metalorganic compounds), (*Metalorganic compounds, Vapor plating).

14. METHODS AND EQUIPMENT

AD-441 312 **Field 14B, 22A**
CFSTI Price: HC$7.00
ARO, Inc., Arnold Air Force Station, Tenn.
FIFTH ANNUAL SYMPOSIUM ON SPACE ENVIRONMENT SIMULATION (5th), MAY 21-22, 1964.
1965, 316p

Descriptors: (*Space environmental conditions, Symposia), (*Symposia, Space environmental conditions), Simulation, Test facilities, Thermal radiation, Solar radiation, Heat transfer, Infrared radiation, Lenses, Optical equipment, Electromagnetic waves, Electric discharges, Spectra (Ultraviolet + visible), Spectra (Infrared), Design, Temperature, Thermal stresses, Satellites (Artificial), Models (Simulation), Manned satellites, Space capsules, Space medicine, Human engineering, Life support, Low-pressure research, Gases, Detection, Probability, Detectors, Altitude chambers.

AD-443 672 **Field 14B, 21A, 21E**
CFSTI Price: HC$2.00
Naval Air Turbine Test Station, Trenton, N. J. Aeronautical Turbine Lab.
AN INVESTIGATION OF THE SUPERSONIC RESEARCH CAPABILITIES OF THE NATTS ALTITUDE TEST FACILITIES. PHASE I. PRELIMINARY ENGINEERING CONSIDERATIONS,
by W. Richard Vollmar. Jun 64, 38p NATTS-ATL-92
Proj. FR-11

Descriptors: (*Supersonic wind tunnels, Air-breathing engines (Unconventional)), (*Altitude chambers, Supersonic characteristics), Test facilities, Turbojet engines, Ramjet engines.

An investigation was made of the supersonic flow capabilities of the NATTS altitude test facility for application to aerodynamic research and free jet airbreathing engine testing. Operation up to a Mach number of 5.0 would be available for research, and up to a Mach number of 2.5 for test of a turbojet engine with 170 pounds per second sea level static airflow. Maximum ramjet engine cross sectional areas would range up to about 21 square feet at a Mach number of 5.0. Reynolds numbers per inch below 750,000 would be available at Mach numbers from 2.5 to 5.0 depending on choice of stagnation pressure and temperature. Parameter varia-tions within design point Mach numbers of 2.5 and 3.0 are given for engine and research tunnels respectively. (Author)

AD-444 940 **Field 14B, 19G, 21H**
CFSTI Price: HC$5.00
Air Proving Ground Center, Eglin AFB, Fla.
CHARACTERISTICS OF VERTICAL PROBE ROCKET VEHICLES,
by Carroll B. Butler and Robert J. Hostetler. Jun 64, 196p APGD-TDR-64-37, APGC-TR-61-43 rev.

Descriptors: (*Sounding rockets, Performance (Engineering)), Payload, Rocket motors, Management planning, Launching, Artillery rockets, Altitude, Data, Handbooks, Acceleration, Sustainer motors, Propulsion, Time, Velocity, Rocket launchers.

The report is an up-dated compilation of the available performance data and information regarding payloads, capabilities, dimensions, weights, and launcher requirements for vertical probe rocket vehicles originally published under APGC-TR-61-43, dated August 1961. A listing of manufacturers of vehicles and rocket motors, information on launchers, and a method for estimating the cost of the vehicles are also provided. This information is presented for use in the planning phase of a program to enable a potential user of vertical probe rocket vehicles to determine the vehicles available, to estimate the funds required to obtain the vehicles, and to determine the sources of procurement for the vehicles. In addition, this report is intended to acquaint interested agencies with the overall capabilities of vertical probe rocket vehicles where new approaches or concepts of testing are required. (Author)

AD-449 719 **Field 14D, 11D**
CFSTI Prices: HC$2.00 MF$0.50
Naval Ordnance Lab., White Oak, Md.
NOL RING TEST METHODS.
Technical rept.,
by Marlin A. Kinna. 9 Sep 64, 36p NOLTR-64-156
Proj. RREN-ST-204/212-5/0000

Descriptors: (*Composite materials, Test methods), (*Test methods, Composite materials), Plastics, Laminated plastics, Filament wound construction, Rings, Tensile properties, Shear stresses, Compressive properties, Deflection.

Methods have been developed for the evaluation of filament wound composite structures making use of NOL ring test specimens. A method of ring fabrication and techniques for determination of ring tensile strength and ring interlaminar shear strength have been standardized and are presented herein. References are also cited for flexural and compression tests now in use. These methods have all been found of value in making materials comparisons in research and development work and have also served as materials quality control techniques. (Author)

AD-457 356 **Field 14B**
CFSTI Price: HC$4.00
Lockheed Missiles and Space Co., Palo Alto, Calif. Materials Sciences Lab.
ELECTRICAL TRANSMISSION COMPONENTS FOR A LARGE AEROSPACE ENVIRONMENTAL CHAMBER,
by Francis J. Clauss. Feb 65, 122p
Contract AF40 (600)-1070,
Proj. 8952
AEDC TR-65-40,
N65 20 932

Descriptors: (*Space simulation chambers, Electrical equipment), (*Electrical equipment, Space simulation chambers), Secondary emission, Albedo, Simulation, Solar radiation, Test facilities, Slip rings, Sliding contacts, Brushes, Incandescent lamps, Electric cables, Silver, Copper, Molybdenum, Molybdenum compounds, Sulfides, Lubricants, Graphited materials, Antiseize compounds, Noise, Resistance (Electrical), Vacuum apparatus, Vacuum.

Identifiers: Molybdenum disulfide.

Secondary radiation in a large aerospace systems environmental chamber can be adequately simulated by an array of tungsten filament lamps mounted on a cage that surrounds the test vehicle. A total of 2528 lamps are required, arranged on 68 circuits that are individually controlled for the purpose of simulating orbital fluctuations. Peak input to each of the circuits is approximately 75A at 430V, and peak total input is 0.818mw. The simulator should be mounted so that it can tumble with the vehicle about the vehicle's pitch axis. Variations in intensity of secondary radiation around the circumference of the vehicle can be programmed electrically so that the simulator need not rotate about the roll axis of the test vehicle. Sliding electrical contacts are preferred to flexible cables or rotary transformers for transmitting power to the simulator, and separate slip rings can be provided for each of the circuits. Self-lubricating power metallurgy composites of silver, copper, and molybdenum disulfide have demonstrated satisfactory performance in ultrahigh vacuum for use on slip rings providing power to the secondary radiation simulator. (Author

AD-460 800 **Field 14E**
CFSTI Price: HC$7.00
Aerospace Technology Div., Library of Congress, Washington, D. C.
QUALITY OF THE PHOTOGRAPHIC IMAGE.
Translations of Soviet-Bloc scientific and technical literature.
11 Mar 65, 377p ATD-T-65-10
TT 66-60215,
N65 26508
Kachestvo Fotograficheskogo Izobrazheniya. Trans. of Uspekhi Nauchnoi Fotografii (USSR) v10 266p 1964.

Descriptors: (*Optical images, State-of-the-art reviews), (*Photographic images, State-of-the-art reviews), Photography, USSR.

Translations of articles on scientific photography: optical images, Photographic images, television images, grain structure of images and photographic materials.

AD-466 569 **Field 14B, 8H**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Reclamation, Denver, Colo. Hydraulics Branch.
INVESTIGATION OF THE EFFECT OF TURNOUT GEOMETRY ON THE REGISTRATION ACCURACY OF A PROPELLER-TYPE OPEN FLOWMETER,
by C. E. Brockway. 28 May 65, 18p Hyd-545
N65 34111

Descriptors: (*Flowmeters, Geometric forms), Hydraulic models, Water, Calibration, Erosion, Pipes, Turbulence.

Measurement of the indicated discharge of a 12-in. propeller-type open flowmeter in laboratory tests showed that the deviations caused either by the change in outlet geometry or by the change in submergence of the outlet pipe did not exceed the normally specified meter accuracy of + or -2%. The meter was calibrated with the outlet pipe discharging first into an open box (unconfined outlet) and then into a confined outlet, similar to a USBR farmturnout design. Calibrations were made for 2 water depths in each outlet type to study the effect of submergence on the indicated discharge. Over the rated range of discharges (0.45 to 4.5 cfs) the difference in indicated discharge for the 2 outlets was less than 1.7% with the maximum deviation occurring at the lowest discharge (0.45 cfs). The maximum variation in indicated discharge caused by an increase in submergence of the outlet pipe of 1.3 pipe diameters was less than 0.6% for the open box and less than 2.0% for the farm turnout. The effect of changes in submergence of the outlet on indicated discharge is not significant, as indicated by best-fit calibration curves, provided that the turnout pipe exit remains fully submerged. The farm turnout tested is probably the minimum size that should be used, because any decrease in outlet well size would cause increased turbulence in the canal section and could cause erosion of the downstream embankment. (Author)

AD-466 768 **Field 14B, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Saint Anthony Falls Hydraulic Lab., Univ. of Minnesota, Minneapolis.
A NEW FACILITY FOR EVALUATION OF MATERIALS SUBJECT TO EROSION AND CAVITATION DAMAGE,
by John F. Ripken, John M. Killen, Scott D. Crist, and Roy M. Kuha. Mar 65, 28p Project Rept-77
Contract Nonr-710 (56),
Proj. NR-062-334,
Task S-R009-01-01

Descriptors: (*Cavitation, Test facilities), (*Erosion, Test facilities), Aluminum alloys, Stainless steel, Impact tests, Damage, Simulation, Failure (Mechanics), Materials.

A new type of test facility for simulating accelerated cavitation damage is described. The facility consists of a rotor with a material specimen attached at the periphery in such a manner that there is repeated impact with a column of liquid droplets during high-speed rotation of the specimen. Preliminary tests indicate that weight loss from a specimen due to erosion follows the same trend as that produced in cavitation damage facilities. Enhanced ability to control impact conditions in this facility permits detailed study of the mechanics of failure. (Author)

AD-470 064 **Field 14E**
CFSTI Prices: HC$5.00 MF$1.00
Tecnifax Corp., Holyoke, Mass.
INVESTIGATION OF HIGH ACUITY NEGATIVE AND POSITIVE CONTINUOUS TONE DIAZOFILMS.
Technical rept., May 63-Mar 65,
by David P. Habib and Eugene J. Zabik. Aug 65, 160p
Contract AF33 (657)-11499,
Proj. AF-6272,
Task 627209
AFAL TR-65-216

Descriptors: (*Photographic film, Organic nitrogen compounds), (*Reconnaissance film, Processing), Aerial photography, Photographic images, Reproduction, Resolution, Photographic materials, Dyes, Photographic processors, Photographic printers, Photographic contrast, Photographic tone, Plasma jets, Sensitivity, Spectra (Visible + ultraviolet).

Identifiers: Diazo reproduction systems.

The purpose of the program was to develop high-acuity diazo-reproduction materials to meet the duplication requirements of aerial reconnaissance films. Initially, the selection of diazofilms for this application is attributed chiefly to their inherent ability to generate copies through several generations with minimum loss in resolution. Other advantages of diazofilms include dry-processing, di-

rect and reversing capability and print durability. The research program was directed toward producing the following: an improved positive-working diazofilm; a new negative-working diazo photo-reproduction system; a laboratory model ammonia-processing unit capable of independent control of the variables affecting development; and detailed information on the performance characteristics of the materials produced. The principal objectives of the program were achieved. The most noteworthy accomplishment was the development of the negative-working diazofilm. This new photo-reproduction method makes possible a complete diazo photo-reproduction system in which aerial negatives can be reproduced as positives or negatives on a variety of translucent or opaque base supports. (Author)

C13.10-250 **Field 14B**
CFSTI Price: MF$1.00
National Bureau of Standards, Washington, D. C.
CALIBRATION AND TEST SERVICES OF THE NATIONAL BUREAU OF STANDARDS.
28 Oct 65, 142p NBS Miscellaneous pub-250
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $1.00. Supersedes ed. of 22 Nov 63; N64-21348, superseded. Reprinted from Federal Register v29 n52 and v30 nos 5, 62, 76, 95 pt2, 154, 156, 157 and 190.

Descriptors: (*Calibration, Standards), (*Measurement, Standards), Resistance (Electrical), Capacitance, Electrochemistry, Measuring devices (Electrical ; Electronic), Magnetic properties, Dielectric properties, Frequency.

C13.10-260-10 **Field 14B**
CFSTI Price: MF$0.50
National Bureau of Standards, Washington, D. C. Inst. for Materials Research
STANDARD REFERENCE MATERIALS: HOMOGENEITY CHARACTERIZATION OF NBS SPECTROMETRIC STANDARDS II: CARTHRIDGE BASS AND LOW-ALLOY STEEL,
by H. Yakowitz, D. L. Vieth, K. F. J. Heinrich, andR. E. Michaelis. 14 Dec 65, 38p NBS Miscellaneous Pub-260-10
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20402, $0.30.

Descriptors: (*Steel, Standards), (*Brass, Standards), (*Microanalysis, Standards), (*Standards, Microanalysis), Test methods, Calibration, Probes (Electromagnetic), Spectrum analyzers, Metallography.

An NBS cartridge brass sample in both the wrought (NBS-1102) and chill cast forms (NBS-C1102), as well as an NBS low-alloy steel sample (NBS-463), was investigated by means of electron probe microanalysis and optical metallography. Some seventeen elements are contained in the brass while twenty-five elements are in the steel. Results for ten elements in the steel are presented while results for six elements in the brass are given. In the steel, Fe, Ni, Cu, and Si are essentially distributed homogeneously at micron levels while Mn, Ta, Nb, Zr, S, and Cr are not. In the brass, Cu and Zn are distributed homogeneously at micron levels while Pb, S, Al, and Si are not. Electron probe microanalyzer results indicate that both NBS-1102 and NBS-C1102 brass are suitable for use as a calibration standard for electron probe microanalysis as well as other microanalytical techniques such as the solids mass spectrometer. The results for brass have been corroborated by a number of laboratories using the electron probe analyzer.

Patent 3,218,947 **Field 14E**
PHOTOFLASH SYNCHRONIZATION SYSTEM.
Patent assigned to Army,
by Myron G. Domsitz. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Photoflash bombs, Synchronization (Electronics)), (*Camera shutters, Synchronization (Electronics)), Reconnaissance missiles, Reconnaissance planes, Patents.

A bomb dropped from an aircraft transmits a precursor signal to the aircraft that energizes elements for opening a camera shutter. Timing elements in the bomb fuse first cause transmission of the signal to the aircraft, then after a delay, to permit opening of the camera shutter, cause the detonation of the bomb.

Patent 3,219,266 **Field 14B**
ANNULATED ROTOR.
Patent assigned to Army,
by Jack Wagman. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Impellers, Centrifuges), (*Centrifuges, Impellers), Material separation, Particles, Patents.

The rotor can be easily adapted for use on any standard centrifuge. It allows a complete physical separation, almost instantaneously. The rotor can be used as an analytical tool to study the kinetics of enzyme reactions, and to study rates of absorption or penetration of ions into bacterial cells or other living material.

Patent 3,219,895 **Field 14C**
DIGITAL SERVO AND INCREMENTAL POSITIONER.
Patent assigned to Army,
by Thomas J. Price. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Digital recording systems, Servomechanisms), Gates (Circuits), Shafts, Computer storage devices, Control systems, Patents.

Identifiers: Binary-decimal code, Binary digits.

A curve plotting device is controlled by a series of stored digit-representative voltages to position an indicating or recording element in accordance with the number expressed by the digits. A plotting system is provided wherein the digit-representative potentials or control data are established in a storage device and are compared with controlled potential or data which are indicative of the rotational position of a shaft which positions the indicating or recording element. When the controlled data conforms to the control data, the indicating or recording element is at the exact coordinate indicated by the stored control data.

PB-169 008 **Field 14D, 15C, 16A**
CFSTI Prices: HC$3.00 MF$0.75
RAND Corp., Santa Monica, Calif.
DETERMINING CHECKOUT INTERVALS FOR SYSTEMS SUBJECT TO RANDOM FAILURES,
by Milton Kamins. 15 Jun 60, 86p RM-2578
Contract AF49 (638)-700,
Proj. RAND

Descriptors: (*Checkout procedure, Scheduling), Reliability, Statistical functions, Mathematical models, Costs, Optimization, Weapon systems.

The report examines some of the apparently important facets of modern weapon-system operations as they affect the topic of checkout scheduling. Section II describes several models designed for ascertaining the highest probabilities of readiness in light of the frequency, severity, accuracy, and duration of checkout. Section III develops cost models. Section IV treats the central problem of optimizing the checkout schedule, and discusses the use of the model in force planning. Section V extends the methods developed previously to the level of sub-systems and lower. Section VI treats the separate, distinct, and highly important topic of monitoring, or continuous checkout. Section VII presents the conclusions of the study.

PB-169 147 **Field 14B, 9A**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
VOLTAGE STANDING WAVE RATIO WAVEGUIDE COMPONENTS FREQUENCY: 2.6 TO 26.5 GHz.
Technical manual instrument calibration procedure, GV-08.
1 Oct 65, 25p NAVWEPS-17-20GV-08
Supersedes NAVWEPS 17-25HV-01 thru NAVWEPS 17-25 HV-05, and NAVWEPS 17-25HV-09, dated 9 Sep 58 thru 1 Apr 63.

Descriptors: (*Standing wave ratios, Measurement), (*Waveguides, Standing wave ratios), Ultrahigh frequency, Voltage, Instruction manuals, Test methods.

The manual describes the measurement procedure for the voltage standing wave ratio (VSWR) of waveguide components in the frequency range of 2.60 to 26.50 GHz as listed in table 1. Appendix A contains a list of components which may be calibrated by this procedure, and the manufacturer's specified maximum acceptable VSWR.

PWAC-462 **Field 14B, 18D**
CFSTI Prices: HC$2.00 MF$0.50
Pratt and Whitney Aircraft, Middletown, Conn. Advanced Nuclear Engineering Lab.
HIGH TEMPERATURE THERMOMETRY AT PRATT AND WHITNEY AIRCRAFT-CANEL,
by P. Bliss and S. Fanciullo. 2 Jun 65, 45p
Contract AT (30-1)-2789

Descriptors: (*Thermocouples, High-temperature research).

SC-RR-65-57 **Field 14B**
CFSTI Prices: HC$2.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
DETACHED LEVER ESCAPEMENT STUDY,
by J. N. Shinkle. May 65, 41p
Contract AT (29-1)-789

Descriptors: (*Clocks, Balances).

UCRL-16260 **Field 14E**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.
A PRECISION TECHNIQUE FOR MEASURING AZIMUTHAL DISTORTION IN OPTICAL LENSES,
by Jack Hohenstein and Duane Norgren. 14 Jul 65, 11p
Contract W-7405-eng-48

Descriptors: (*Camera lenses, Distortion).

15. MILITARY SCIENCES

CEX-65.4 **Field 15F, 6R, 18C**
CFSTI Prices: HC$2.75 MF$1.25
Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
BIOLOGICAL TOLERANCE TO AIR BLAST AND RELATED BIOMEDICAL CRITERIA,
by Clayton S. White, I. Gerald Bowen, andDonald R. Richmond. Apr 65, 253p
Contract AT (29-1)-1242

Descriptors: (*Tolerances (Physiology), Nuclear explosions), (*Radiobiology, Nuclear explosions).

16. MISSILE TECHNOLOGY

AD-467 132 **Field 16A, 13J**
CFSTI Prices: HC$3.00 MF$0.75
Naval Weapons Lab., Dalgren, Va.
TERRIER STRUCTURAL FIRING TESTS ABOARD THE ITALIAN NAVAL SHIP ANDREA DORIA,

210-195 O - 66 - 19

by J. W. Loving, T. I. Dodson, A. D. Smith, andJ. C. Stephens. 17 Jun 65, 69p NWL-1982

Descriptors: (*Guided missiles (Surface-to-air), Firing test (Ordnance)), (*Naval vessels (Combatant), Guided missiles (Surface-to-air)), Launching, Crusiers, Temperature, Pressure, Guided missile launchers, Noise, Concrete, Tests, Gas leaks, Toxicity, Exhaust gases, Shipborne.

Identifiers: Terrier.

Eight TERRIER MARK 12 MOD O boosters with concrete slugs were fired aboard the Italian Naval Ship Andrea DORIA to investigate the adequacy of the protection for the TERRIER launching system personnel against blast effects and to determine the effects of the booster exhaust on the ship's structure. During the test series, measurements of toxic gas leakage into personnel areas, sound pressure levels, air temperatures, and exhaust stream pressures were obtained. The results indicated to major structural deficiencies. There was some gas and smoke leakage into personnel areas adjacent to the launcher; exposure of equipment and ordnance to high temperatures and superficial structural damage. (Author)

Patent 3,219,791 **Field 16D, 13H**
METHOD OF WELDING NON-FRAGMENTATION WARHEADS FOR MISSILES PARTICULARLY ANTIAIRCRAFT MISSILES.
Patent assigned to Navy,
by George W. Galloway. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Resistance welding, Steel), (*Guided missile warheads, Welding), Patents, Surfaces, Pressure, Guided missiles (Surface-to-air).

Steel members of small cross section are electrically welded together under high pressure. A thin shim is interposed between the surfaces of the steel members to be welded. Very high pressure is applied to compress the shims and an electric current is flowed through the members and the shims for a fraction of a second.

Patent 3,224,751 **Field 16A**
HYDRAULIC CYLINDER-ZERO EXTERNAL VOLUMETRIC CHANGE TYPE.
Patent assigned to Navy,
by Zenas B. Andrews. 21 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Guided missile launchers, Supports), (*Hydraulic systems, Guided missile launchers), Patents, Valves, Shipborne, Underwater.

The hydraulic strut is associated with a launcher having a vertically disposed firing tube. The launcher is mounted on a ship or submarine. The firing tube is separated. The strut is mounted between the firing and outer tubes, which is a hydraulic member having piston-like compression and tension valves. The strut is normally locked out; that is, the valves are separated under the fluid pressure within the strut. An external force of a predetermined magnitude results in stroking of the compression or tension valve. Movement of a valve displaces fluid from the cylinder and opens a passageway into a low pressure chamber. The locked position of the strut is immediately broken, and removes its resistance to the normal action of the elastomeric mounting.

17. NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

AD-427 765 **Field 17I, 9E**
CFSTI Prices: HC$2.00
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
HIGH POWER PROGRAM. HIGH POWER PROJECT, PROJECT DELILAH.
Semiannual rept., 1 Jul-31 Dec 63,
by L. J. Anderson and L. H. Groth. 31 Dec 63, 37p CAL-UB-1309-P-110
Contract DA-30-069-ORD-2554, ARPA Order-53-59

Descriptors: (*Radar tracking, Research program administration), Detection, Microwaves, Ionosphere, Propagation, Scattering, Ionization, Satellites (Artifical), Radar tracking, Radar echo areas, S-band, Frequency, Target acquisition, Doppler effect, Guided missile defection, Noise (Radar), Radar interference, Aurorae, Radar clutter, Radar reflectors, Radar reflections, Radar antennas, Radar equipment, Radar transmitters, Waveguides, Antimissile defense system, Radar pulses.

Contents: Radar observations of satellites-- Satellite acquisition and tracking, Doppler programmer, Experimental results; S-band auroral clutter; Correction of antenna reflector surface; Resonant ring development--High power resonant ring, and Intermediate power resonant ring.

AD-449 657 **Field 17G**
CFSTI Price: HC$1.00
Naval Air Development Center, Johnsville, Pa. Aeronautical Instruments Lab.
EVALUATION OF INERTIAL SENSORS AND SYSTEMS FOR AIRCRAFT APPLICATIONS.
Technical note,
by Ronald S. Vaughn. 28 Aug 64, 25p NADC-AI-6460
Prepared for presentation at the Inertial Guidance Test Symposium (2nd), sponsored by the Air Force Missile Development Center, Holloman Air Force Base, N. Mex.

Descriptors: (*Inertial navigation, Performance (Engineering)), (*Inertial guidance, Test methods), Accelerometers, Gyroscopes, Tests, Test facilities, Naval aircraft, Naval share establishments, Drift, Stability, Life expectancy, Temperature, Sensitivity, Magnetic fields, Stabilized platforms.

Identifiers: Sensors (Instrumentation).

Component evaluations performed at the Naval Air Development Center are directed primarily towards aircraft applications, although much of the information obtained is directly applicable to missile problems. Tests performed are described in detail, among them warm-up time, static drift test with power. spectral density analysis, and change in bias. A more detailed analysis of tumbling data is performed. Wheel performance parameters are monitored as indicators of gyro life. Accelerometer tests are also described, including the extensive use of 72 point and 6 point tumbling tests, temperature cycling, magnetic sensitivity tests, and warm-up test. (Author)

AD-466 029 **Field 17H, 9B, 14C**
CFSTI Prices: HC$1.00 MF$0.50
Army Missile Command, Redstone Arsenal, Ala. Electromagnetics Lab.
A DIGITAL FORMATTER AND RECORDING SYSTEM FOR THE OPTICAL DISCRIMINATION SYSTEM,
by Roy York. 2 Nov 64, 17p RE-TN-64-13

Descriptors: (*Digital recording systems, Optical tracking), (*Optical tracking, Digital recording systems), Analog-to-digital converters, Magnetic tape, Input-output devices, Data processing systems, Computers.

A digital formatter and recording system capable of accepting data from several sources and producing an IBM compatible tape is discussed. The formatter can handle data from an optical multiple-target tracker, azimuth and elevation angles of a sensor, aircraft attitude reference and range time. The system will be used for recording data from some of these sources at the Kwajalein Test Site. The magnetic tape will be sent back to Redstone Arsenal for data reduction. This equipment makes it possible to utilize the automatic digital optical tracker and collect tracking data on multiple objects. Range time and TV azimuth and elevation are also recorded to assist correlation with other instrumentation. The formatter and recorder offer the optical discrimination system the capability of collecting large amounts of data and utilization of general purpose digital computers for data reduction. (Author)

Patent 3,219,744 **Field 17D, 5I, 17I**
RADAR SIGNAL INTERFERENCE TRAINER.
Patent assigned to Navy,
by Isidore J. Mazziotti and Seymour Schneider. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Radar antijamming, Training devices), (*Radar interference, Training devices), Radar jamming, Radar operators, Backward-wave operators, Modulation, Radar signals, Simulation, Patents.

A system is provided for training radar operators in de-jamming techniques without affecting the battle or readiness capabilities of the associated radar used during a training operation. Circuitry is provided for modulating a backward-wave oscillator without any resulting undesirable frequency or amplitude changes in the characteristic of the output carrier wave signal of the backward-wave oscillator used to simulate jamming signals.

Patent 3,219,828 **Field 17G**
VIBRATING RETICLE STAR TRACKER.
Patent assigned to NASA,
by John V. Foster. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Star trackers, Reticles), Telescopes, Vibrators (Mechanical), Scanning, Corrections, Patents.

The star tracker is utilized on a space vehicle. The star tracker includes a fixed and vibrating reticle. The fixed reticle is mounted in the focal plane of the telescope. The movable reticle is fixed to a reed anchored at one end, but otherwise free to vibrate. Scanner motion in a single plane produces signals to provide telescope correction about two axes.

PB-169 149 **Field 17I, 9E, 1E**
CFSTI Prices: HC$3.00 MF$0.50
National Aviation Facilities Experimental Center, Atlantic City, N. J. Test and Evaluation Div.
EVALUATION OF SFD-315 MAGNETRON AND SOLID STATE DUPLEXER FOR ASDE-2.
Final rept.,
by Woodrow R. Applegate. Oct 65, 54p
Proj. 241-004-01V
SRDS RD-65-122

Descriptors: (*Magnetrons, Performance (Engineering)), (*Duplexers (Electronic), Performance (Engineering)), Radar equipment, Semiconductor devices, Airport radar systems, Tests, Resolution, Life expectancy.

Evaluation of an Inverted Circular Electric Mode (ICEM) Coaxial Magnetron and a Solid State Duplexer was undertaken to determine their suitability as replacements for corresponding components originally incorporated in Airport Surface Detection Equipment (ASDE-2). The report describes the SFD-315 magnetron and the Solid State Duplexer and presents the results of various tests conducted to appraise their performance. The ASDE-2 at NAFEC was equipped with specially modified modulators for tests of the SFD-315 magnetron. The Solid State Duplexer was operated in an unmodified channel of the radar and performed satisfactorily throughout a life-test period of 2500 hours. It was concluded that satisfactory system performance can not be achieved using the modified modulators provided for operation of the SFD-315 magnetron; however, the SFD-315 magnetron is suitable for ASDE-2 applications with a compatible modulator, and may be expected to operate satisfactorily for more than 5000 hours.

It was also concluded that the Solid State Duplexer is a suitable replacement for the original duplexer of ASDE-2.

PB-169 152 **Field 17G, 1B**
CFSTI Prices: HC$2.00 MF$0.50
National Aviation Facilities Experimental Center, Atlantic City, N. J. Test and Evaluation Div.
MAXIMUM ACCURACY COMPATIBLE DME.
Final rept.,
by D. Michael Brandewie. Sep 65, 38p
Proj. 330-003-02X
SRDS RD-65-116

Descriptors: (*Distance-measuring equipment, Instrument landings), (*Instrument landings, Distance-measuring equipment), (*Flight instruments, Distance-measuring equipment), Navigational aids, Aircraft landings, Ground position indicators, Cathode ray tube screens, Oscilloscopes, Flight testing, Compatibility.

A high accuracy compatible DME system was tested to determine the video and indicator distance readout accuracy on the approach path to NAFEC Runway 13-31, Atlantic City Airport, New Jersey. The ground station was a Hazeltine (Model DTB), (formerly used in the now decommissioned pulse-multiplex NSME system), modified to operate at high accuracy in the normal DME frequency band. The airborne DME receiver was a high accuracy modified AVQ-70. The flight test results show the video system error and the indicator system error to be well within the plus or minus 250-foot tolerance specified by FAA Contract ARDS 585. Various design problems were investigated, the worst of which resulted in a mean shift at close ranges due to system overload. Limited tests indicated that the high accuracy DME system is compatible with the VORTAC system. (Author)

PB-169 153 **Field 17B, 17G**
CFSTI Prices: HC$2.00 MF$0.50
National Aviation Facilities Experimental Center, Atlantic City, N. J. Test and Evaluation Div.
DATA TRANSFER EXPERIMENTATION FOR CONUS.
Interim rept.,
by William F. Sullivan. Dec 65, 50p
Proj. 232-002-01X
SRDS RD-65-110

Descriptors: (*Radio communication systems, Air traffic control systems), (*Air traffic control systems, Radio communication systems), (*Data transmission systems, Air traffic control systems), Simulation, Input-output devices, Digital systems, Display systems, Cockpits.

Identifiers: CONUS.

Tests were conducted at the National Aviation Facilities Experimental Center using the Model A traffic control simulator to explore the use of digital high speed communications in the air traffic control environment. Simulated input and output devices were provided for use by the controllers working at an en route position so that the controllers were able to select, compose, and transmit traffic control messages to the simulator pilots by other than the usual voice methods. The results indicated that there are eight major categories of messages that are suitable for ground-to-air transmission using digital methods in lieu of voice. Three of these categories (altitude, frequency, and heading change instructions) require quick-action input keys for the controller and should be displayed to the pilot on a miniature 4-digit indicator in the cockpit. Such control instructions require priority handling and therefore need instantaneous pilot acknowledgement by voice. The other five categories involve clear text messages that should be displayed to the pilot on a cockpit printer. They are selected from computer storage and have a lower priority than the altitude and heading change instructions. Some input devices for text messages need to be tailored to match the airways structure of various en route sectors in which they are used. (Author)

PB-169 154 **Field 17G**
CFSTI Prices: HC$3.00 MF$0.75
Lear Siegler, Inc., Grand Rapids, Mich. Instrument Div.
DIGITAL TIME DIFFERENCE ADAPTER FOR THE APN-152 LORAN C RECEIVER.
Final rept.,
by D. DeMyer and V. Adams. Aug 65, 60p
Contract FA-WA-4659,
Proj. FA-350-102-02N
SRDS RD-65-97

Descriptors: (*Analog-to-digital converters, Loan equipment), (*Loran equipment, Analog-to-digital converters), Airborne, Navigational aids, Design, Semiconductor devices, Clocks, Miniature electronic equipment, Hyperbolic navigation.

With the advent of digital computers capable of generating aircraft navigation and control functions from hyperbolic time difference inputs, it is necessary to provide an interface between the receiver and the computer. This problem has been handled by an electro-mechanical encoder in the past, but it is apparent that the analog-to-digital interface can be accomplished electronically by an all solid state microminiature unit. The adapter has been designed and constructed and tests performed show acceptable accuracy of conversion with a minimum modification to the receiver. It has been determined that the adapter concept will be compatible with all present-day airborne Loran C Receivers, including the ARN-78. (Author)

18. NUCLEAR SCIENCE AND TECHNOLOGY

ACNP-65001 **Field 18M, 20M**
CFSTI Prices: HC$2.00 MF$0.75
Allis-Chalmers Mfg. Co., Milwaukee, Wis. Atomic Energy Div.
STEAM SEPARATION TECHNOLOGY UNDER THE EURATOM PROGRAM.
Quarterly progress rept. 1 Jan 65 - 31 Mar 65,
9 Apr 65, 50p EURAEC-1376
Contract AT (11-1)-1186

Descriptors: (*Steam, Separation), (*Drying, Nuclear reactors).

AD-443 879 **Field 18D, 14B**
CFSTI Price: HC$2.00
Army Nuclear Defense Lab., Edgewood Arsenal, Md.
GLASS MICRODOSIMETRY SYSTEM USED AT THE U. S. ARMY NUCLEAR DEFENSE LABORATORY,
by Edward E. Lissak and Robert J. Smith. May 64, 29p NDL-SP-6
Proj. DASA-06.007

Descriptors: (*Dosimeters, Operation), (*Gamma rays, Measurement), Health physics instrumentation, Phosphate glass, Phosphates, Aluminum compounds, Silver compounds, Ionization, Energy, Luminescence, Ultraviolet radiation, Fluorescence, Laboratories.

The silver-activated phosphate-glass microdosimeter system employed at the U.S. Army Nuclear Defense Laboratory is explained. The advantages and disadvantages of the system, as well as the idiosyncracies of the mocrodosimeters themselves, are reported. It is concluded that this system provides an efficient and reliable method of determining gamma dose in the range from 1,000,000 to 400,000 rads. (Author)

AD-446 446 **Field 18F**
CFSTI Price: HC$3.00
Technical Operations Research, Burlington, Mass.
THE DOSE RESULTING FROM 1.25 MeV PLANE SOURCE BEHIND VARIOUS ARRANGEMENTS OF IRON BARRIERS.
Final rept.,
by Dominic J. Raso and Stanley Woolf. Jun 64, 53p TO-B-64-49
Contract OCD-OS-62-219
Also includes Summary of Final rept., by Dominic J. Raso.

Descriptors: (*Gamma rays, Shielding), Metal plates, Iron, Shelters, Radiological dosage, Monte Carlo method, Gamma-ray scattering, Gamma counters.

Calculations were performed by the Monte Carlo method to determine the dose at various positions behind parallel barriers (circular or rectangular). In some cases, the parallel barriers were separated. Also, calculations were made for a blockhouse geometry. The results were obtained for a 1.25 MeV plane monodirectional source incident on 20.5, 41.0, and 61.5 psf of iron. Comparisons were made with roof reduction factors obtained by Spencer and with experiments. (Author)

AD-450 598 **Field 18H, 18C**
CFSTI Price: HC$7.00
Research Triangle Inst., Durham, N. C. Operations Research and Economics Div.
RADIOLOGICAL RECOVERY CONCEPTS, REQUIREMENTS, AND STRUCTURES. VOLUME II. SPECIFIC CONSIDERATIONS AND SUPPORTING DOCUMENTS.
Final rept., vol 2,
by Joseph T. Ryan, Joseph D. Douglass, Jr. and Herbert E. Campbell. 16 Oct 64, 312p R-OU-156-vol-2
Contract OCD-PS-64-56,
Proj. RTI-OU-156,
Task 3233B

Descriptors: (*Radiological warfare, Countermeasures), (*Radioactive fallout, Decontamination), Radiological contamination, Effectiveness, Dose rate, Civil defense systems, Radiation hazards, Cleaning, Contamination, Structures.

The report contains five studies concerned with determining the costs and effectiveness of decontamination applied to postattack recovery in a fallout environment. These studies cover the following subjects: (1) The Effect of Early Decontamination of Total Dose: This study describes the effect of a single (discrete) reduction in radiation intensity (i.e., by decontamination) on an individual's dose history in a t to the -1.2 power radiation field; (2) The Effect of Early Decontamination of ERD: This analysis is like the first in describing the effect of a single reduction in radiation intensity, except that an individual's dose is measured in terms of his ERD; (3) Total Dose Approximations for Brief Exposure in a Fallout Environment: Two approximations to the expression used to calculate total dose for a finite exposure time in a t to the -Kth power radiation field developed and the resultant error is estimated. (4) The Effectiveness of Radiological Countermeasures in Accelerating Postattack Recovery: This study develops the parametric relationships that determine which radiological countermeasures could accelerate the postattack recovery process. (Author)

AD-450 606 **Field 18H, 18C, 14A**
CFSTI Price: HC$2.00
Research Triangle Inst., Durham, N. C. Operations Research and Economics Div.
RADIOLOGICAL RECOVERY CONCEPTS, REQUIREMENTS, AND STRUCTURES. VOLUME I. GENERAL CONSIDERATIONS.
Final rept., vol 1,
by Joseph T. Ryan, Joseph D. Douglas, Jr. and Herbert E. Campbell. 16 Oct 64, 47p R-OU-156 Vol-1
Contract OCD-PS-64-56,
Proj. RTI-OU-156,
Task 3233B

Descriptors: (*Radioactive fallout, Decontamination), (*Decontamination, Cost effectiveness), Civil defense systems, Radiological dosage, Radiological contamination, Radiation hazards, Dose rate, Fallout shelters, Urban areas.

The study examines the effectiveness and costs associated with the application of decontamination to accelerating recovery of an activity in a postattack fallout environment. The effectiveness is measured in two ways: first, by the fractional reduction in dose rate that can be achieved by decontamination, and second, when the dose received during the activity is specified, by the fractional reduction in denial time that can be achieved by decontamination. The costs are described in terms of the personnel and equipment required for the decontamination, the radiation doses received by the personnel, and the water required by the operation. The recovery of an activity is defined in terms of radiation doses received by the activity personnel in performing the activity. When these doses are reduced to an acceptable safety level by reducing the dose rate in the activity area, the activity is said to be recovered. The above dose constraints are expressed both in terms of the maximum total dose and in terms of the maximum equivalent residual dose. The primary conclusion reached, that decontamination is as vital to recovery as shelters are to survival in a fallout environment, is the basis for recommending further studies analyzing the application of decontamination to integrated whole-city recovery. (Author)

AD-456 495 **Field 18H**
CFSTI Price: HC$3.00
Naval Radiological Defense Lab., San Francisco, Calif.
REMOVAL OF SIMULATED FALLOUT FROM PAVEMENTS BY CONVENTIONAL STREET FLUSHERS,
by D. E. Clark, Jr. and W. C. Cobbin. 18 Jun 64, 85p USNRDL-TR-797

Descriptors: (*Pavements, Decontamination), (*Radioactive fallout, Disposal), (*Maintenance vehicles, Feasibility studies), Simulation, Nuclear explosions, Nozzles, Surface burst, Cleaning.

A conventional motorized street flusher was evaluated as a suitable decontamination tool to be used in the operational recovery of extensive paved areas contaminated with fallout from a land-surface nuclear detonation. The selection of fallout parameters such as particle size and initial mass levels was based on a theoretical fallout model. The flusher nozzle orientation was adjusted for maximum decontamination effectiveness. This adjustment can be applied to any flusher to be used for similar purposes. Using a fixed set of flusher adjustments and constant-size test area, the effects of 4 particle size ranges, 3 mass levels, and 2 types of surfaces on removal effectiveness were determined. A majority of the tests conducted were in agreement with previously developed theoretical equations describing decontamination in terms of residual mass as a function of expended effort. (Author)

AI-MEMO-7585 **Field 18L, 18N**
CFSTI Prices: HC$5.00 MF$1.25
Atomics International, Canoga Park, Calif.
NUCLEAR SPACE POWER SYSTEMS,
by H. M. Dieckamp. Sep 64, 193p
Contract AT-11-1-GEN-8

Descriptors: (*Spacecraft nuclear propulsion, Design), (*Auxilary power plants, Nuclear power plants).

ANL-6776 **Field 18K, 18Y**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
PHYSICS PERFORMANCE OF THE EBWR IN ITS OPERATION FROM ZERO TO 100 MWt,
by H. P. Iskenderian. May 65, 27p
Contract W-31-109-eng-38

Descriptors: (*Boiling water reactors, Performance (Engineering)), (*Reactor operation, Boiling water reactors).

ANL-6929 **Field 18H, 18I, 18M**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
SAFETY ANALYSIS REPORT FOR THE ARGONNE ADVANCED RESEARCH REACTOR CRITICAL EXPERIMENT,
by C. N. Keiber, E. F. Groh and K. E. Plumlee. Jun 65, 59p
Contract W-31-109-eng-38

Descriptors: (*Reactor hazards, Critical assemblies).

ANL-7013 **Field 18J, 7E**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
LABORATORY INVESTIGATIONS IN SUPPORT OF FLUID-BED FLUORIDE VOLATILITY PROCESSES. PART VII. THE DECOMPOSITION OF GASEOUS PLUTONIUM HEXAFLUORIDE BY ALPHA RADIATION,
by Raymond P. Wagner, William A. Shinn, and Jack Fischer. May 65, 32p
Contract W-31-109-eng-38

Descriptors: (*Reactor fuels, Decomposition), (*Decomposition, Alpha bombardment).

ANL-7038 **Field 18J, 20M**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
A LIQUID-METAL HEAT-TRANSFER EXPERIMENT,
by B. E. Holtz. Jun 65, 34p
Contract W-31-109-eng-38

Descriptors: (*Liquid metals, Heat transfer), (*Heat transfer, Liquid metals).

ANL-7090 **Field 18I, 18F**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT, AUGUST 1965.
21 Sep 65, 86p
Contract W-31-109-eng-38

Descriptors: (*Liquid metal cooled reactors, Reactor operation), (*Reactor safety systems, Nuclear engineering).

BAW-1280-26 **Field 18L**
CFSTI Prices: HC$3.00 MF$0.50
Babcock and Wilcox Co., Barberton, Ohio. Boiler Div.
SODIUM-HEATED STEAM GENERATOR DEVELOPMENT.
Progress rept. no. 24,
by Paul Robert. Apr 65, 54p
Contract AT (11-1)-1280

Descriptors: (*Steam power plants, Power reactors), (*Power reactors, Steam power plants).

BAW-3376-2 **Field 18J, 18H**
CFSTI Prices: HC$3.00 MF$0.50
Babcock and Wilcox Co., Lynchburg, Va. Nuclear Development Center.
IRRADIATION PERFORMANCE OF THORIA-URANIA FUEL MATERIALS.
Quarterly technical rept. no. 2, Oct-Dec 64.
Dec 64, 51p
Contract AT (30-1)-3376

Descriptors: (*Reactor fuel elements, Radiation damage), (*Radiation damage, Reactor fuel elements).

BAW-3376-3 **Field 18J, 11F**
CFSTI Prices: HC$3.00 MF$0.50
Babcock and Wilcox Co., Lynchburg, Va. Nuclear Development Center.
IRRADIATION PERFORMANCE OF THORIA-URANIA FUEL MATERIALS.
Quarterly technical rept. no. 3, Jan-Mar 65.
Mar 65, 47p
Contract AT (30-1)-3376

Descriptors: (*Reactor fuels, Radiation damage), (*Radiation damage, Reactor fuels).

BMI-1727 (DEL.) **Field 18J, 18B**
CFSTI Prices: HC$1.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING MAY 1965,
by Russell W. Dayton and Stan J. Paprocki. 1 Jun 65, 43p
Contract W-7405-eng-92

Descriptors: (*Reactor materials, Radioactive isotopes).

BMI-1733 (DEL.) **Field 18J, 18B**
CFSTI Prices: HC$1.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING JUNE 1965,
by Russell W. Dayton and Stan J. Paprocki. 1 Jul 65, 46p
Contract W-7405-eng-92

Descriptors: (*Reactor materials, Radioactive isotopes).

BNWL-SA-54 **Field 18J, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
IONIC DIFFUSION IN HIGH TEMPERATURE URANIUM DIOXIDE,
by J. L. Bates. 1 Jul 65, 24p CONF-650704-7
Contract AT (45-1)-1830
Prepared for presentation at IAEA Symposium on Thermodynamics, Vienna., 22-27 Jul 1965.

Descriptors: (*Reactor fuel elements, Diffusion), (*Diffusion, Ions).

BNWL-109 **Field 18I, 18M**
CFSTI Prices: HC$3.00 MF$0.75
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PRTR CONTAINMENT VESSEL PRESSURE TEST EXPERIENCE,
by R. G. Clark and D. R. Koherg. Aug 65, 78p
Contract AT (45-1)-1830

Descriptors: (*Containment, Test reactors), (*Test reactors, Plutonium).

BNWL-112 **Field 18J**
CFSTI Prices: HC$3.00 MF$0.75
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
HIGH-TEMPERATURE GRAPHITE IRRADIATIONS 860 TO 1200 DEG C.
Interim rept. no. 1,
by J. W. Helm. Sep 65, 79p
Contract AT (45-1)-1830

Descriptors: (*Graphite, Radiation damage), (*Radiation damage, High-temperature research).

BNWL-113-6 **Field 18J, 18I, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PLUTONIUM ABSTRACTS. VOLUME V, NUMBER VI.
30 Jul 65, 41p
Contract AT (45-1)-1830

Descriptors: (*Plutonium, Reactor materials), (*Nuclear reactors, Plutonium).

BNWL-113-8 **Field 18J, 7E, 6R**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PLUTONIUM ABSTRACTS. VOLUME 5, NUMBER 8.
30 Sep 65, 37p
Contract AT (45-1)-1830

Descriptors: (*Plutonium, Reactor materials), (*Reactor materials, Plutonium).

BNWL-127 **Field 18K, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
MONTE CARLO CALCULATED MATERIAL BUCKLINGS OF 3 wt PERCENT ENRICHED URANIUM-WATER LATTICES WITH URANIUM IN THE WATER MODERATOR,
by L. L. Carter. Sep 65, 33p
Contract AT (45-1)-1830

Descriptors: (*Buckling (Neutron density), Monte Carlo method), (*Reactor fuel enrichment, Reactor lattice parameters).

BNWL-131A **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
FABRICATION COSTS FOR PLUTONIUM FUEL ELEMENTS. PART A: VARIABLE COSTS OF FABRICATING UO2-PuO2 FUEL RODS FOR THE PLUTONIUM RECYCLE CRITICAL FACILITY,
by C. H. Bloomster. Sep 65, 24p
Contract AT (45-1)-1830

Descriptors: (*Reactor fuel elements, Costs), (*Plutonium, Reactor fuel rods).

BNWL-131C **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
FABRICATION COSTS FOR PLUTONIUM FUEL ELEMENTS. PART C: VARIABLE COSTS OF FABRICATING UO2-Pu2 FUEL RODS FOR THE SAXTON REACTOR,
by C. H. Bloomster. Sep 65, 27p
Contract AT (45-1)-1830

Descriptors: (*Reactor fuel elements, Costs), (*Plutonium, Reactor fuel rods).

BNWL-156 **Field 18K**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
THE STATIONARY CALCULATION OF RATIOS IN REACTOR STATICS,
by Jeffery Lewins. Oct 65, 25p
Contract AT (45-1)-1830

Descriptors: (*Reactor kinetics, Power reactors), (*Iterative methods, Reactor kinetics).

BNWL-59 **Field 18J, 14B**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
AN INSTRUMENT FOR MEASURING BOWING IN LONG TUBES,
by B. B. Brenden and J. C. Spanner. Aug 65, 37p
Contract AT (45-1)-1830

Descriptors: (*Reactor system components, Deformation), (*Deformation, Measurement).

CEX-62-50 **Field 18K, 18C**
CFSTI Prices: HC$1.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
NEUTRON-FIELDS AND INDUCED-ACTIVITY MEASUREMENTS--OPERATION BREN,
by F. M. Tomnovec and J. M. Ferguson. Sep 65, 40p

Descriptors: (*Nuclear explosions, Simulation), (*Fast reactors, Neutron transport theory).

CONF-650407 **Field 18G**
CFSTI Prices: HC$12.75 MF$5.00
Oak Ridge National Lab., Tenn.
INTERNATIONAL SYMPOSIUM ON FISSION PRODUCT RELEASE AND TRANSPORT UNDER ACCIDENT CONDITIONS, APRIL 5-7, 1965, OAK RIDGE, TENNESSEE. VOLUMES I AND II.
7 Apr 65, 1243p
Contract W-7405-eng-26

Descriptors: (*Fission products, Symposia).

CONF-650602-33 **Field 18K, 18I**
CFSTI Prices: HC$1.00 MF$0.50
Knolls Atomic Power Lab., Schenectady, N. Y.
CROSS SECTIONS FOR REACTOR DESIGN.
by N. C. Francis. Jun 65, 11p
Contract W-31-109-eng-52
Prepared for presentation at American Nuclear Society Annual Meeting, Gatlinburg, Tenn.

Descriptors: (*Nuclear reactors, Design), (*Nuclear cross sections, Nuclear reactors).

DP-1012 **Field 18B**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont De Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
RADIOACTIVE COBALT FOR HEAT SOURCES,
by J. Walter Joseph, Jr., Harvey F. Allen andCarl L. Angerman. Oct 65, 36p
Contract AT (07-2)-1

Descriptors: (*Cobalt, Radioactive isotopes).

DP-967 **Field 18I, 18J, 18M**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont De Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
THE INITIAL CRITICAL AND ZERO POWER TESTING OF THE HWCTR,
by Thomas C. Gorrell. Oct 65, 49p
Contract AT (07-2)-1

Descriptors: (*Test reactors, Tests).

DP-971 **Field 18I, 18M**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont De Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
PERFORMANCE OF HWCTR SAFETY ROD AND CONTROL ROD DRIVE SYSTEMS,
by Eugene O. Kigler and Stephen H. Kale. Oct 65, 42p
Contract AT (07-2)-1

Descriptors: (*Test reactors, Reactor safety systems), (*Reactor control, Test reactors).

DP-977 **Field 18J, 18K**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont de Nemours (E.I.) and Co., Aiken, S. C. Savannah River Lab.
RADIOLYSIS OF ION EXCHANGE RESINS USED IN THE PURIFICATION SYSTEMS OF SAVANNAH RIVER REACTORS,
by Elizabeth W. Brumann. Jul 65, 17p
Contract AT (07-2)-1

Descriptors: (*Radiolysis, Ion exhange resins), (*Nuclear reactors, Purification).

EURAEC-1207 **Field 18J, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Centre National de Recherches Metallurgiques, Liege (Belgium).
STUDY OF THE EMBRITTLEMENT BY PLASTIC FATIGUE OF STEEL USED FOR REACTOR VESSELS.
Quarterly rept. no. 3, 1 Jul-30 Sep 64.
30 Sep 64, 48p
Contract 005-63-12,
Proj. 288

Descriptors: (*Reactor materials, Steel), (*Embrittlement, Reactor materials).

EURAEC-1276 **Field 18J, 11F**
CFSTI Prices: HC$2.00 MF$0.75
Centre National De Recherches Metallurgiques, Liege (Belgium).
A STUDY ON PLASTIC FATIGUE EMBRITTLEMENT IN REACTOR VESSEL STEELS.
Quarterly rept no. 4, 1 Oct-31 Dec 64.
Jan 65, 40p
Contract 005-63-12 TEEB,
Proj. 288

Descriptors: (*Reactor materials, Steel), (*Embrittlement, Fatigue (Mechanics)).

GA-4617 (Pt 1) **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
General Atomic, John J. Hopkins Lab. for Pure and Applied Science, San Diego, Calif.
ADVANCED, GRAPHITE-MATRIX, DISPERSION-TYPE FUEL SYSTEMS.
Quarterly progress rept for the period ending 30 Sep 63,
by J. C. Bokros, W. V. Gooddel, J. R. Hooker,H. K. Lonsdale, and L. R. Zumwalt. 30 Sep 63, 37p
Contract AT (04-3)-167

Descriptors: (*Graphite moderated reactors, Reactor fuel elements), (*Reactor fuel elements, Graphite moderated reactors).

GA-5314 **Field 18J**
CFSTI Prices: HC$3.00 MF$0.75
General Atomic San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
IRRADIATION TEST OF THE GAIL III-B FUEL ELEMENT IN THE GENERAL ATOMIC IN-PILE LOOP,
by R. F. Turner, R. G. Baumgartel, andH. I. Leon.
10 Jul 64, 69p
Contract AT (04-3)-314

Descriptors: (*Reactor fuel elements, Radiation damage), (*Test reactors, Reactor fuel elements).

GA-5520 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
General Atomic, John J. Hopkins Lab. for Pure and Applied Science, San Diego, Calif.
A PROGRAM OF BASIC RESEARCH ON MECHANICAL PROPERTIES OF REACTOR MATERIALS.
Quarterly progress rept. for the period ending 30 Apr 64,
by R. H. Chambers and T. A. Trozers. 30 Apr 64, 21p
Contract AT (04-3)-167

Descriptors: (*Reactor materials, Mechanical properties), (*Mechanical properties, Reactor materials).

210-195 O - 66 - 20

GA-5636 **Field 18H, 18J**
CFSTI Prices: HC$3.00 MF$0.75
General Atomic, John J. Hopkins Lab. for Pure and Applied Science, San Diego, Calif.
EFFECTS OF NEUTRON IRRADIATION ON MATERIALS SUBJECTED TO MULTIAXIAL STRESS DISTRIBUTIONS.
Final rept.,
by T. A. Trozera, P. W. Flynn, and G. Buzzelli. 15 Sep 64, 78p
Contract AT (04-3)-167

Descriptors: (*Radiation damage, Steel), (*Pressure vessels, Reactor system components).

GA-5814 **Field 18I**
CFSTI Prices: HC$1.00 MF$0.50
General Atomic San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
GENERAL ATOMIC IN-PILE LOOP OPERATIONS AND MODIFICATIONS.
Summary rept.,
by Richard F. Turner. 20 Oct 64, 18p
Contract AT (04-3)-167

Descriptors: (*Reactor operation, Test reactors), (*Gas-cooled reactors, Reactor operation).

GA-6303 **Field 18J, 13M**
CFSTI Prices: HC$3.00 MF$0.75
General Atomic, San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
FINITE ELEMENT ANALYSIS OF AXISYMMETRIC COMPOSITE STRUCTURES,
by Y. R. Rashid. 4 Jun 65, 81p
Contract AT (04-3)-167

Descriptors: (*Reactor system components, Structures), (*Structures, Composite materials).

GAMD-3877 **Field 18K, 18J**
CFSTI Prices: HC$3.00 MF$0.75
General Atomic, John J. Hopkins Lab. for Pure and Applied Science, San Diego, Calif.
POISON EQUIVALENT MEASUREMENT OF THE WORTH OF INDIVIDUAL HTGR CONTROL RODS WITHIN A REGION OF INFLUENCE,
by J. B. Sampson. 4 Feb 63, 57p
Contract AT (04-3)-314,
Proj. 32.210

Descriptors: (*Gas-cooled reactors, Control rods), (*Reactor poisons, Gas-cooled reactors).

GEAP-4490 **Field 18J, 7D, 11F**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., San Jose, Calif. Vallecitos Atomic Lab.
ELECTRON BEAM MICROPROBE STUDIES OF THE OXIDATION BEHAVIOR OF THE TEMPERATURE STEAM. I. TRACE INTERPRETATION TECHNIQUES,
by E. G. Brush. Mar 64, 57p
Contract AT (04-3)-189

Descriptors: (*Reactor fuel cladding, Oxidation), (*Tracer studies, Electron microscopy).

GNEC-361 **Field 18J**
CFSTI Prices: HC$6.00 MF$1.25
General Nuclear Engineering Corp., Dunedin, Fla.
ADVANCED BONUS CORE DEVELOPMENT PROGRAM.
Quarterly progress rept. no. 3, May-Jul 64,
by John F. Gibbons, Ray L. Lyerly, William A. Maxwell, and R. E. Roach. 15 Aug 64, 228p
Contract AT(40-1)-3154

Descriptors: (*Reactor cores, Design).

HASL-164 **Field 18H, 6R**
CFSTI Prices: HC$7.00 MF$1.50
Health and Safety Lab., New York Operations Office (AEC), N. Y.
HEALTH AND SAFETY LABORATORY FALLOUT PROGRAM.
Quarterly summary rept., Jun 1-Sep 1 65,
by Edward P. Hardy, Jr. and Joseph Rivers. 1 Oct 65, 332p

Descriptors: (*Radioactive fallout, Scientific research).

HW-SA-3400 **Field 18J**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
NONDESTRUCTIVE TESTER PROBLEMS IN PRODUCTION APPLICATIONS: SENSITIVITY, MEASUREMENT ERROR AND ECONOMIC CONSIDERATIONS,
by C. J. Denton. 5 Jun 64, 6p CONF-662-2
Contract AT (45-1)-1350
Presented at National Convention of Society for Nondestructive Testing (24th), Philadelphia, Oct 1964.

Descriptors: (*Reactor system components, Nondestructive testing), (*Non-destructive testing, Reactor system components).

HW-SA-3439 **Field 18J, 7B**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
REACTION OF TSX GRAPHITE WITH WATER VAPOR,
by R. C. Giverson and J. P. Walker. Apr 64, 19p
Contract AT (45-1)-1350

Descriptors: (*Graphite, Oxidation), (*Water vapor, Graphite).

HW-SA-3481 **Field 18J**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
THE KINETICS OF SOLID STATE ELECTRODIFFUSION OF SOME TRANSITION ELEMENTS IN GAMMA-CERIUM, GAMMA-URANIUM, AND EPSILON-PLUTONIUM,
by R. H. Moore, E. M. Smith, and J. R. Morrey.
11 May 64, 23p
Contract AT (45-1)-1350

Descriptors: (*Diffusion, Transition elements), (*Transition elements, Reactor materials).

HW-SA-3483 **Field 18J**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
MAJOR ACCOMPLISHMENTS OF HANFORD LABORATORIES IN PLUTONIUM FUELS DEVELOPMENT,
by G. M. Dalen. 21 Apr 64, 14p
Contract AT (45-1)-1350

Descriptors: (*Plutonium, Reactor fuels), (*Reactor fuels, Plutonium).

HW-SA-3628 **Field 18J, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
THE EFFECTS OF REACTOR DECONTAMINATING SOLUTIONS ON INTERGRANULARLY CORRODED TYPE 304 STAINLESS STEEL,
by A. P. Larrick. 9 Oct 64, 11p CONF-654-55
Contract AT (45-1)-1350
Prepared for presentation to American Nuclear Society Meeting, San Francisco, Nov.-Dec. 1964.

Descriptors: (*Reactor system components, Decontamination), (*Stainless steel, Corrosion).

HW-79029 **Field 18J, 7A, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
ION EXCHANGE PURIFICATION OF PROMETHIUM IN THE 222-S BUILDING, 1-F CUBICLE,
by J. S. Buckingham. 1 Jul 64, 12p
Contract AT (45-1)-1350

Descriptors: (*Promethium, Purification).

HW-80808 **Field 18J, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
PHYSICAL DAMAGE IN PLUTONIUM,
by R. D. Nelson, T. K. Bierlein, and F. E. Bowman. Feb 64, 27p
Contract AT (45-1)-1350

Descriptors: (*Plutonium, Transformations), (*Metallography, Plutonium).

HW-82372 **Field 18F**
CFSTI Prices: HC$3.00 MF$0.75
Hanford Atomic Products Operation, Richland, Wash.
PRELIMINARY SAFEGUARDS ANALYSIS HIGH TEMPERATURE LATTICE TEST REACTOR,
by W. W. Brown, R. E. Heineman. 1 Jun 64, 89p
Contract AT (45-1)-1350

Descriptors: (*Reactor safety systems, Test reactors), (*Test reactors, Reactor safety systems).

HW-84085 **Field 18J**
CFSTI Prices: HC$3.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
ENGINEERING STUDY-INCREASED PROCESSING FLEXIBILITY-PUREX, PART II,
by R. D. Ehrlich, J. R. La Riviere, J. N. Nordahl, and J. C. Willi. 24 Jun 64, 55p
Contract AT (45-1)-1350

Descriptors: (*Reactor fuel processing, Separation).

HW-84330 **Field 18L**
CFSTI Prices: HC$2.00 MF$0.50
Hanford Atomic Products Operation, Richland, Wash.
N-REACTOR CONVERSION, 185-N GENERATING PLANT AUXILIARY POWER SUPPLIES,
by Roy C. Hoffman. 3 Nov 64, 28p
Contract AT (45-1)-1350

Descriptors: (*Power reactors, Auxilary power plants), (*Auxilary power plants, Reactor start-up sources).

IDO-14630 **Field 18J, 7B**
CFSTI Prices: HC$2.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
REMOVAL OF TRIBUTYL PHOSPHATE AND ITS DEGRADATION PRODUCTS FROM ACIDIFIED URANYL NITRATE SOLUTIONS,
by H. T. Hahn, E. M. Vander Wall, and R. H. Ray. Aug 64, 32p
Contract AT (10-1)-205

Descriptors: (*Uranium, Solvent extraction), (*Phosphates, Separation).

Identifiers: Tributyl phosphate, Uranyl nitrate.

IDO-14663 **Field 18K, 18J**
CFSTI Prices: HC$2.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
BURNUP DETERMINATION OF NUCLEAR FUELS.
Project rept., 1 Apr-30 Jun 65,
by William J. Maeck and James E. Rein. Sep 65, 23p
Contract AT (10-1)-205

Descriptors: (*Fuel burn up, Determination).

IDO-14664 **Field 18B, 7E**
CFSTI Prices: HC$1.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
SEPARATION OF TELLURIUM AND IODINE FROM OTHER FISSION PRODUCTS: APPLICATION TO LOFT SAMPLES,
by Myra D. Anderson and T. R. Thomas. Sep 65, 24p
Contract AT (10-1)-205

Descriptors: (*Fission products, Isotope separation), (*Isotope separation, Fission products).

IDO-14665 **Field 18G, 20M**
CFSTI Prices: HC$1.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
MEASUREMENT OF HEAT GENERATION RATE OF HIGHLY RADIOACTIVE CALCINED ALUMINA,
by D. W. Rhodes and M. E. Jacobson. Oct 65, 17p
Contract AT (10-1)-205

Descriptors: (*Radioactive waste, Heat transfer), (*Heat transfer, Radioactive waste).

IDO-17052 **Field 18I, 18K, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
NUCLEAR TECHNOLOGY BRANCHES QUARTERLY REPORT, JULY 1 - SEPTEMBER 30, 1964. FORMERLY -- MATERIALS TESTING REACTOR-ENGINEERING TEST REACTOR TECHNICAL BRANCHES.
Feb 65, 94p
Contract AT (10-1)-205

Descriptors: (*Nuclear engineering, Reactor theory), (*Reactor materials, Nuclear engineering).

IDO-17081 **Field 18I, 18K, 18J**
CFSTI Prices: HC$4.00 MF$1.00
Phillips Petroleum Co. Idaho Falls, Idaho. Atomic Energy Div.
NUCLEAR TECHNOLOGY BRANCHES QUARTERLY REPORT, OCTOBER 1-DECEMBER 31, 1964.
31 Dec 64, 147p
Contract AT (10-1)-205

Descriptors: (*Reactor operation, Reactor kinetics), (*Reactor materials, Reactor theory).

IDO-17120 **Field 18K, 20H**
CFSTI Prices: HC$2.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.

TOPICS IN NUCLEAR REACTOR THEORY,
by A. W. Solbrig, Jr. Sep 65, 36p
Contract AT (10-1)-205

Descriptors: (*Reactor kinetics, Neutron transport theory), (*Neutron transport theory, Nuclear reactors).

KAPL-M-6162 **Field 18K**
CFSTI Prices: HC$1.00 MF$0.50
Knolls Atomic Power Lab., Schenectady, N. Y.
CALCULATION OF DELTA K FROM NEUTRON FLUX,
by R. L. Mathews. 18 Dec 64, 10p
Contract W-31-109-eng-52

Descriptors: (*Neutron flux, Reactor reactivity), (*Reactor reactivity, Neutron flux).

KAPL-M-6430 **Field 18K, 9B**
CFSTI Prices: HC$3.00 MF$0.75
Knolls Atomic Power Lab., Schenectady, N. Y.
OSCAR. A PILE OSCILLATOR DATA REDUCTION PROGRAM FOR THE PHILCO 2000 DIGITAL COMPUTER,
by J. N. Brazos, B. A. Gottschalk and A. L. Liedel. 30 Nov 64, 57p
Contract W-31-109-eng-52

Descriptors: (*Reactor kinetics, Programming (Computers)), (*Programming (Computers), Reactor kinetics).

KAPL-M-6431 **Field 18K, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Knolls Atomic Power Lab., Schenectady, N. Y.
KWIP 4. KINETICS WITH PLOTTER,
by Gerhard O. Meuller. 7 Dec 64, 23p
Contract W-31-109-eng-52

Descriptors: (*Reactor reactivity, Programming (Computers)), (*Programming (Computers), Reactor reactivity).

KAPL-M-6459 **Field 18J, 9B, 13A**
CFSTI Prices: HC$3.00 MF$0.75
Knolls Atomic Power Lab., Schenectady, N. Y.
TUBE-STRESS ANALYSIS OF U-TUBE TYPE HEAT EXCHANGERS,
by A. E. Spivak and G. L. Lechliter. 3 May 65, 73p
Contract W-31-109-eng-52

Descriptors: (*Heat exchangers, Reactor system components), (*Stresses, Programming (Computers)).

KAPL-M-6464 **Field 18K, 9B, 20D**
CFSTI Prices: HC$1.00 MF$0.50
Knolls Atomic Power Lab., Schenectady, N. Y.
FLAP-A PHILCO-2000 DIGITAL COMPUTER PROGRAM FLOW, LOOP AND PUMP,
by C. W. Sorenson. Mar 65, 18p KAPL-M-CWS-10
Contract W-31-109-eng-52

Descriptors: (*Reactor coolants, Fluid flow), (*Programming (Computers), Fluid flow).

KAPL-2165-2 **Field 18K, 9B**
CFSTI Prices: HC$4.00 MF$0.75
Knolls Atomic Power Lab., Schenectady, N. Y.
KARE: A SYSTEM OF DIFFUSION THEORY PROGRAMS FOR THE PHILCO 2000. VOLUME II. GROUP CONSTANT AND DEPLETION CALCULATIONS,
by D. E. Goodman, P. V. Oby, and W. H. Turner. Jun 64, 109p
Contract W-31-109-eng-52

Descriptors: (*Reactor kinectics, Programming (Computers)), (*Programming (Computers), Reactor kinetics).

KAPL-3088 **Field 18J**
CFSTI Prices: HC$1.00 MF$0.50
Knolls Atomic Power Lab., Schenectady, N. Y.
FRACTURE-TOUGHNESS DETERMINATIONS OF A 302-B AND Ni - Mo - V FORGING STEEL WITH VARIOUS-SIZED SPECIMENS. PART II,
by D. F. Mowbray and K. Minassian. 15 Dec 64, 25p
Contract W-31-109-eng-52

Descriptors: (*Reactor system components, Pressure vessels), (*Steel, Fracture (Mechanics)).

LA-3352 **Field 18G, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
FISSION FRAGMENT REMOVAL OF URANIUM FROM A FISSIONING SURFACE,
by P. J. Peterson and M. M. Thorpe. 5 Jul 65, 21p
Contract W-7405-eng-36

Descriptors: (*Fission products, Transport properties), (*Uranium, Fission products).

LA-3387 **Field 18H, 7E**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., N. Mex.
RADIATION DAMAGE TO ALKALI HALIDES AND OTHER SIMPLE IONIC CRYSTALS,
by Frank E. Pretzel. Jul 65, 23p
Contract W-7405-eng-36

Descriptors: (*Radiation damage, Alkali metal compounds), (*Alkali metal compounds, Halides).

MATT-268 **Field 18A, 20I**
CFSTI Prices: HC$3.00 MF$0.75
Princeton Univ., N. J. Plasma Physics Lab.
POWER BALANCE IN HELIUM DISCHARGES IN THE C STELLARATOR,
by A. S. Bishop, A. Gibson, E. Hinnov andF. W. Hoffman. May 64, 51p
Contract AT (30-1)-1238

Descriptors: (*Thermonuclear reactions, Control), (*Plasma physics, Electric discharges).

MIT-2098-51 **Field 18D**
CFSTI Prices: HC$1.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Lab. for Nuclear Science.
A LIQUID NITROGEN COOLED ADSORPTION NEON-RECOVERY SYSTEM,
by B. M. Bailey and A. Buffington. 23 Jun 64, 5p
Contract AT (30-1)-2098

Descriptors: (*Radiation measurement systems, Liquefied gases), (*Neon, Recovery.

MLM-1244 **Field 18J**
CFSTI Prices: HC$3.00 MF$0.50
Mound Lab., Miamisburg, Ohio.
REACTOR FUELS AND MATERIALS DEVELOPMENT. PLUTONIUM RESEARCH.
Annual rept. for 64,
by L. J. Wittenberg and G. R. Grove. 31 Dec 64, 56p
Contract AT (33-1)-GEN-53

Descriptors: (*Reactor fuels, Plutonium), (*Plutonium, Reactor fuel processing).

MND-3169-18 Field 18N
CFSTI Prices: HC$2.00 MF$0.75
Martin Co., Baltimore, Md. Nuclear Div.
DYNAMICS AND LOADS ANALYSES OF SUPPORT STRUCTURE FOR SNAP-19 GENERATORS (NIMBUS APPLICATION),
by B. T. Bata and R. S. Buxbaum. Aug 64, 46p
Contract AT (30-1)-3169

Descriptors: (*Nuclear power plants, Spacecraft), (*Auxiliary power plants, Supports).

MND-3169-21 Field 18N
CFSTI Prices: HC$2.00 MF$0.50
Martin Co., Baltimore, Md. Nuclear Div.
SNAP-19 PROGRAM ELECTRICAL INTEGRATION CONCEPTUAL STUDY,
by M. Monaco and C. Karr. Jun 64, 42p
Contract AT (30-1)-3169

Descriptors: (*Nuclear power plants, Spacecraft), (*Electrical properties, Auxiliary power plants).

MND-3169-60 Field 18N
CFSTI Prices: HC$3.00 MF$0.75
Martin Co., Baltimore, Md. Nuclear Div.
SNAP-19 PROGRAM. GENERATOR PROTOTYPE QUALIFICATION ENVIRONMENTAL TEST REPORT ELECTRICALLY TEST REPORT ELECTRICALLY HEATED SYSTEM NO. 2. PART I. HUMIDITY AND DYNAMIC TESTS,
by C. L. Riggen. Apr 65, 67p
Contract AT (30-1)-3169

Descriptors: (*Nuclear power plants, Spacecraft), (*Environmental tests, Auxiliary power plants).

MND-3169-61 Field 18N
CFSTI Prices: HC$4.00 MF$1.25
Martin Co., Baltimore, Md. Nuclear Div.
SNAP-19 PROGRAM. GENERATOR SUPPORT STRUCTURE TRANSMISSIBILITY TEST REPORT,
by G. N. Numsen. Apr 65, 118p
Contract AT (30-1)-3169

Descriptors: (*Nuclear power plants, Spacecraft), (*Auxiliary power plants, Supports).

MND-3297-9 Field 18J, 18L
CFSTI Prices: HC$6.00 MF$1.50
Martin Co., Baltimore, Md. Nuclear Div.
PM CORE 2 UPRATING STUDY. MAXIMUM POWER CAPABILITY OF PM CORE 2.
Final rept.,
by J. T. Trushin, W. M. Brittain, C. George.E. Guenther and F. Russo. Dec 64, 274p
Contract AT (30-1)-3297

Descriptors: (*Reactor cores, Power), (*Power reactors, Reactor cores).

MURA-708 Field 18D
CFSTI Prices: HC$1.00 MF$0.50
Midwestern Universities Research Assn., Stoughton, Wis.
MAGNETIC FIELD CALCULATIONS SUITABLE FOR A HEAVY LIQUID BUBBLE CHAMBER MAGNET,
by F. J. Kriegler and S. C. Snowdon. 23 Feb 65, 16p
Contract W-31-109-eng-38

Descriptors: (*Bubble chambers, Magnets), (*Magnets, Magnetic fields).

NAA-SR-MEMO-10676 Field 18N
CFSTI Prices: HC$1.00 MF$0.50
Atomics International, Canoga Park, Calif.
EMITTANCE AND SOLAR ABSORPTION TEST-SNAP 10A, FS-4,
by J. R. Crosby. 27 Jan 65, 4p
Contract AT-11-1-GEN-8

Descriptors: (*Nuclear power plants, Spacecraft), (*Solar radiation, Control surfaces).

NAA-SR-MEMO-10694 Field 18J, 18N, 20D
CFSTI Prices: HC$1.00 MF$0.50
Atomics International, Canoga Park, Calif.
FLOW DIVIDED FOR MRP T/E PUMP COOLANT,
by K. A. Thomasson. 20 Oct 64, 23p
Contract AT (11-1)-GEN-8

Descriptors: (*Flow separation, Liquid metal pumps), (*Liquid metal pumps, Reactor system components).

NAA-SR-MEMO-10881 Field 18J, 18K
CFSTI Prices: HC$3.00 MF$0.75
Atomics International, Canoga Park, Calif.
ANALYTIC TECHNIQUES FOR THE CALCULATION OF THE ORNL TOWER SHIELD EXPERIMENTS. PART III. ANNEX-3,
by R. S. Hubner. 5 Jan 65, 71p
Contract AT (11-1)-GEN-8

Descriptors: (*Reactor shielding calculations, Neutron transport theory), (*Neutron transport theory, Reactor shielding calculations).

NAA-SR-MEMO-10918 Field 18K, 18J
CFSTI Prices: HC$3.00 MF$0.75
Atomics Internationa, Canoga Park, Calif.
AGE OF FISSION NEUTRONS TO INDIUM RESONANCE ENERGY IN IRON-WATER MIXTURES. PART II. THEORY,
by H. Alter. 6 Apr 65, 78p
Contract AT (11-1)-GEN-8

Descriptors: (*Neutron age, Fission neutrons), (*Reactor moderators, Neutron transport theory).

NAA-SR-MEMO-11135 Field 18J
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
FUEL ELEMENT DESIGN, ANALYSES, SPECIFICATIONS, AND EXAMINATION PROCEDURES FOR THE HWOCR EXP-NRU-305 EXPERIMENTS,
by J. E. Frank, R. D. Hahn, and P. S. Olson. 9 Mar 65, 33p
Contract AT-11-1-GEN-8

Descriptors: (*Reactor fuel elements, Design), (*Uranium compounds, Carbides).

NAA-SR-10856 Field 18H, 18N
CFSTI Prices: HC$1.00 MF$0.50
Atomics International, Canoga Park, Calif.
COMPARISON OF NEUTRON AND GAMMA RADIATION DAMAGE IN SEMICONDUCTORS,
by M. N. Robinson. 10 Jun 65, 14p
Contract AT (11-1)-GEN-8

Descriptors: (*Radiation damage, Semiconductors), (*Neutron reactions, Gamma rays).

NYO-2979-34 Field 18D
CFSTI Prices: HC$3.00 MF$0.50
Atlantic Research Nuclear Corp., Alexandria, Va.
ORGANOMETALLIC RADIATION DOSIMETRY SYSTEMS,
by Joseph Kivel. 31 May 65, 52p
Contract AT (30-1)-2979

Descriptors: (*Dosimeters, Metalorganic compounds), (*Metalorganic compounds, Dosimeters).

NYO-3363-1 Field 18J, 11H
CFSTI Prices: HC$3.00 MF$0.50
Mechanical Technology Inc., Latham, N. Y.
PRELIMINARY STUDY OF THE LIQUID METAL LOOP AND TEST RIG FOR PHASE II OF THE INVESTIGATION OF LIQUID METAL LUBRICATED BEARINGS AND ROTOR-BEARING DYNAMICS,
by W. D. Waldron and E. B. Arwas. 23 Feb 65, 55p MT1-64TR72 (Rev.2)
Contract AT (30-1)-3363

Descriptors: (*Bearings, Reactor system components), (*Liquid metals, Lubrication).

NYO-3364-1 Field 18H, 6H
CFSTI Prices: HC$1.00 MF$0.50
Norsk Hydros Inst. for Cancer Research, Oslo. (Norway).
REPORT ABOUT CESIUM 137 IN MILK FROM SPRING 1964,
by Kjell Madshus, Aksel Stroemme andKristian Koren. 1964, 18p
Contract AT (30-1)-3364

Descriptors: (*Milk, Radiological contamination), (*Cesium, Milk).

NYO-3421-3 Field 18D, 9A
CFSTI Prices: HC$2.00 MF$0.50
David Sarnoff Research Center, Princeton, N.J.
PHOTOMULTIPLIER INVESTIGATION.
Summary rept. 15 Jun 64-1 Mar 65,
by H. M. Smith, Jr. and R. Wasserman. 14 Apr 65, 43p
Contract AT (30-1)-3421

Descriptors: (*Photomultipliers, Scintillation counters), (*Scintillation counters, Photomultipliers).

NYO-3462-1 Field 18B
CFSTI Prices: HC$2.00 MF$0.50
Belfer Graduate School of Science, Yeshiva Univ., New York.
STABLE ISOTOPE STUDIES.
Annual progress rept., 15 Sep 64-15 Jul 65,
by T. Hughes, Lois Nash Kender, E. U. Monse andW. Spindel. 15 Jul 65, 36p
Contract AT (30-1)-3462

Descriptors: (*Stable isotopes, Nitrogen compounds).

ORINS-50 Field 18D, 7C, 8G
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge Inst. of Nuclear Studies, Tenn.
COBALT MOLYBDATE CATALYST FOR AMBIENT TEMPERATURE SYNTHESIS OF BENZENE FOR LIQUID SCINTILLATION RADIOCARBON DATING,
by John E. Noakes, Stephen M. Kim, and L. K. Akers. Apr 65, 15p
Contract AT-40-1-GEN-33

Descriptors: (*Scintillation counters, Geologic age, Determination), (*Benzene, Synthesis), (*Cobalt compounds, Molybdates).

Identifiers: Radiocarbon dating.

ORNL-IIC-5 Field 18D, 18B
CFSTI Prices: HC$4.00 MF$1.75
Oak Ridge National Lab., Tenn.
PROCEEDINGS OF SYMPOSIUM ON LOW-ENERGY X- AND GAMMA SOURCES AND APPLICATIONS HELD AT ILLINOIS INSTITUTE OF TECHNOLOGY RESEARCH INSTITUTE, CHICAGO, ILLINOIS, OCTOBER 20-21, 1964,
by Philip S. Baker and Martha Gerrard. Oct 65, 380p CONF-641017
Contract W-7405-eng-26

Descriptors: (*Nuclear industrial applications, Symposia), (*Symposia, Nuclear industrial applications).

ORNL-NSIC-5-Vols. 1 and 2 **Field 18I**
CFSTI Prices: HC$14.00 MF$5.75
Oak Ridge National Lab., Tenn. Nuclear Safety Information Center.
U. S. REACTOR CONTAINMENT TECHNOLOGY. A COMPILATION OF CURRENT PRACTICE IN ANALYSIS, DESIGN, CONSTRUCTION, TEST, AND OPERATION,
ed. by William B. Cottrell and A. W. Savolainen. Aug 65, 1447p
Contract W-7405-eng-26
Prepared in cooperation with Bechiel Corp., San Francisco, Calif.

Descriptors: (*Nuclear reactors, Containment), (*Containment, Handbooks).

ORNL-P-1034 **Field 18F, 18D**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
SAMPLING DEVICES USED IN NUCLEAR SAFETY PILOT PLANT,
by Peter P. Holtz and Thomas H. Row. 1964, 7p CONF-650602-10
Contract W-7405-eng-26
Prepared for presentation at American Nuclear Society 11th Annual Meeting, Gatlinburg, Tenn.

Descriptors: (*Reactor safety systems, Samplers), (*Samplers, Reactor safety systems).

ORNL-P-1272 **Field 18J, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
EXPERIENCE WITH UNUSUAL TECHNIQUES USED IN ORNL DEPLETION CODES,
by D. R. Vondy. 1965, 17p CONF-650501-13
Contract W-7405-eng-26
Presented at the Application of Computing Methods to Reactor Problems, Argonne, Ill.

Descriptors: (*Fuel burn up, Programming (Computers)), (*Programming (Computers), Fuel burn up).

ORNL-P-1448 **Field 18H, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
THE EFFECT OF RADIATION ON ATOMIC REARRANGEMENTS IN Fe-N, Cu-Ni, AND Cu-Al ALLOYS,
by J. T. Stanley, J. M. Williams, and M. S. Wechsler.
Jun 65, 16p CONF-650904-6
Contract W-7405-eng-26
Prepared for Presentation at Symposium on Radiation Effects, Asheville, N. C., 8-10 Sep 1965.

Descriptors: (*Radiation damage, Alloys), (*Alloys, Radiation damage).

ORNL-P-861 **Field 18J, 13H**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
DEMOUNTING AND MACHINING IN HOT CELLS.
by E. M. King and S. E. Dismuke. 4 Oct 64, 20p CONF-650601-1
Contract W-7405-eng-26
Presented at Symposium on working methods in high-activity hot labs., Paris.

Descriptors: (*Mechanical working, Reactor materials), (*Reactor materials, Mechanical working).

ORNL-TM-1142 **Field 18H, 11F**
CFSTI Prices: HC$3.00 MF$0.75
Oak Ridge National Lab., Tenn.
IRRADIATION BEHAVIOR OF THORIUM-URANIUM ALLOYS AND COMPOUNDS,
by A. R. Olsen, D. B. Trauger, W. O. Harms, R. E. Adams, and D. A. Douglas. Jun 65, 63p CONF-650615-3
Contract W-7405-eng-26
Prepared for presentation at IAEA Panel on Utilization of Thorium in Power Reactors, Vienna., 14-18 Jun 1965.

Descriptors: (*Radiation damage, Thorium alloys), (*Thorium alloys, Uranium alloys).

ORNL-TM-1169 **Field 18I**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
FAST FRACTURE ANALYSIS OF EGCR PRESSURE VESSEL,
by R. C. Berggren. 21 Jun 65, 30p
Contract W-7405-eng-26

Descriptors: (*Gas-cooled reactors, Pressure vessels), (*Pressure vessels, Fracture (Mechanics)).

ORNL-TM-1170 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
MOTION OF PARTICLES IN FLUIDIZED BEDS AND IMPLICATIONS FOR THE PREPARATION OF COATED NUCLEAR FUEL PARTICLES,
by R. L. Pilloton and J. A. Carpenter. Aug 65, 27p
Contract W-7405-eng-26

Descriptors: (*Reactor fuel cladding, Preparation).

ORNL-TM-1175 **Field 18K, 9B, 12A**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
THE DETERMINATION OF NEUTRON FLUX IN NUCLEAR REACTORS BY THE UN-COLLIDED-FLUX ESTIMATOR APPLIED TO MONTE CARLO COLLISIONS,
by J. Wallace Webster. 1965, 38p
Contract W-7405-eng-26

Descriptors: (*Neutron flux, Programming (Computers)), (*Programming (Computers), Monte Carlo method).

ORNL-TM-733 **Field 18I, 18F**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
MSRE DESIGN AND OPERATIONS REPORT. PART VI. OPERATING SAFETY LIMITS FOR THE MOLTEN-SALT REACTOR EXPERIMENT,
by S. E. Beall and R. H. Guymon. 3 Aug 65, 4p
Contract W-7405-eng-26

Descriptors: (*Fused salts cooled reactors, Design), (*Reactor safety systems, Fused salts cooled reactors).

ORNL-2873 **Field 18G, 18I**
CFSTI Prices: HC$4.00 MF$0.75
Oak Ridge National Lab., Tenn.
THE COSTS OF PERMANENT DISPOSAL OF POWER-REACTOR FUEL-PROCESSING WASTES IN TANKS,
by J. O. Blomeke, E. J. Frederick and R. Salmon. Sep 65, 118p
Contract W-7405-eng-26

Descriptors: (*Radioactive waste, Disposal), (*Reactor fuel processing, Radioactive waste).

ORNL-3754 **Field 18J, 18K**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
HOT-CELL DISSOLUTION OF HIGHLY IRRADIATED 20 PERCENT PuO2-80 PERCENT UO2 FAST-REACTOR FUEL SPECIMENS,
by J. B. Goode. Oct 65, 23p
Contract W-7405-eng-26

Descriptors: (*Reactor fuel elements, Fast reactors), (*Fast reactors, Reactor kinetics).

ORNL-3782 **Field 18I, 18D, 6R**
CFSTI Prices: HC$5.00 MF$1.00
Oak Ridge National Lab., Tenn.
INSTRUMENTATION AND CONTROLS DIVISION.
Annual progress rept. for period ending 1 Sep 64.
Aug 65, 172p
Contract W-7405-eng-26

Descriptors: (*Nuclear engineering, Instrumentation), (*Reactor control, Nuclear engineering).

ORNL-3811 **Field 18G, 7A**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
LABORATORY DEMONSTRATION OF THE TWO-STEP PROCESS FOR DECONTAMINATING LOW-RADIOACTIVITY-LEVEL PROCESS WASTE WATER BY SCAVENGING-PRECIPITATION AND FOAM SEPARATION,
by W. Davis, Jr., A. H. Kibbey, and R. Schonfeld. Oct 65, 32p
Contract W-7405-eng-26

Descriptors: (*Radioactive waste, Decontamination), (*Water, Radioactive waste).

ORNL-3836 **Field 18A, 20I**
CFSTI Prices: HC$5.00 MF$1.00
Oak Ridge National Lab., Tenn.
THERMONUCLEAR DIVISION SEMIANNUAL PROGRESS REPORT FOR PERIOD ENDING APRIL 30, 1965.
Sep 65, 147p
Contract W-7405-eng-26

Descriptors: (*Thermonuclear reactions, Control), (*Plasma physics, Control systems).

ORNL-3837 **Field 18J, 18K**
CFSTI Prices: HC$3.00 MF$0.75
Oak Ridge National Lab., Tenn.
IRRADIATION BEHAVIOR OF HIGH BURNUP TH02-4.45 PERCENT UO2 FUEL RODS,
by S. A. Rabin, J. W. Ullmann, and E. L. Long, Jr. Oct 65, 66p
Contract W-7405-eng-26

Descriptors: (*Reactor fuel rods, Fuel burn up), (*Fuel burn up, Radiation damage).

Patent 3,219,408 **Field 18J, 7B**
CHEMICAL DISINTEGRATION AND RECOVERY OF URANIUM FROM SINTERED GRAPHITE-URANIUM COMPACTS.
Patent assigned to AEC,
by Mildred J. Bradley and Leslie M. Ferris. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Reactor fuel elements, Decomposition), (*Uranium, Recovery), Graphite, Nitric acid, Uranium compounds, Thorium compounds, Nitrates, Refractory materials, Patents.

Identifiers: Uranyl nitrate.

The process is for recovering uranium from neutronirradiated nuclear fuel elements or unirradiated fuel element scrap. A graphite-uranium compact is contacted with an aqueous solution of nitric acid to disintegrate the graphite and form a solution of uranyl nitrate. The nitrate is treated to recover the uranium.

Patent 3,219,535 **Field 18I**
NUCLEAR REACTOR CONTROL MEANS.
Patent assigned to AEC,
by Thomas R. Robbins. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Nuclear reactors, Control systems), Design, Reactor cores, Patents.

The seed-blanket nuclear reactor produces power at a low cost. The assembly includes an outer, annular, fixed core section containing fissionable material; an inner, cylindrical, movable core section containing fissionable material; and an annular safety element containing a material of high-neutron-capture cross section disposed for longitudinal movement between the fixed and movable core sections.

Patent 3,219,541 **Field 18J**
METHOD OF PREVENTING CARBURIZATION OF FUEL ELEMENT CLADDING METALS BY URANIUM CARBIDE FUELS.
Patent assigned to AEC,
by Bradley A. Webb. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Reactor fuel elements, Cladding), (*Carbides, Reactor fuels), Metals, Reactor fuels, Uranium compounds, Carbides, Stainless steel, Impurities, Iron, Patents, Carbon.

The uranium carbide, nuclear reactor fuel element has a carburizable metal cladding which is stabilized against carburization by carbon transfer from the fuel material present. The carbon-stable reactor fuel material consists of UC plus U2C3 and a metal cladding of ferrous metal.

Patent 3,219,736 **Field 18J**
METHOD FOR PRODUCING HYDROSTATIC PRESSURE.
Patent assigned to AEC,
by Eugene A. Stisser. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Hydrostatic pressure, Production), (*Reactor fuel elements, Compacting), High-temperature research, Patents, High-pressure research, Cooling, Compressive properties.

The method is used for producing nuclear fuel elements with densities approaching theoretical. The contraction of a rapidly cooled mass of molten metal is used to exert pressure on the body to be compressed. The body is surrounded by a material having a higher coefficient of thermal expansion which is then melted, thereby subjecting the body to a high temperature. The material is then rapidly cooled, the cooling reaching the body to be compacted last. Because of the greater thermal expansion of the melted material, this cooling subjects the body to be formed, while it is still at a high temperature, to a very high pressure.

Patent 3,219,825 **Field 18D, 9A**
SOLID STATE RADIATION DETECTION SYSTEM WITH LOW NOISE AMPLIFICATION.
Patent assigned to AEC,
by Richard H. Graham. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Radiation measurement systems, Semiconductor devices), (*Semiconductor devices, Radiation measurement systems), Parametric amplifiers, Diodes (Semiconductor), Signal-to-noise ratio, Patents.

A radiation detection system is provided wherein a radio frequency component of the pulse output signal from a solid state radiation detector is amplified by a parametric amplifier to provide radiation signal data of a sufficiently high level that it may be processed by various electronic analyzing circuits and the like without detriment from noise generated therein.

Patent 3,222,125 **Field 18J**
DISSOLUTION OF NUCLEAR ALUMINUM-BASE FUEL.
Patent assigned to AEC,
by Wallace W. Schulz. 7 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Reactor fuels, Solutions), (*Aluminum, Reactor fuel processing), Nitric acid, Catalysts, Mercury compounds, Nitrates, Patents.

Identifiers: Mercuric nitrate.

The process is for dissolving neutron bombarded nuclear aluminum-base fuel. The fuel is immersed in boiling nitric acid, of a concentration of between 0.8 and 1.2M, containing a mercuric ion catalyst until the fuel assumes a grey color. Concentrated nitric acid is added to obtain a concentration of 4 to 6 M, whereupon the fuel is dissolved.

Patent 3,222,289 **Field 18J, 11F, 7B**
DISSOLUTION OF ZIRCONIUM IN TITANIUM EQUIPMENT.
Patent assigned to AEC,
by Walter E. Clark and Theodore A. Gens. 7 Dec 65
Available from Commissioner of Patents, Wash-

Descriptors: (*Zirconium, Solutions), (*Titanium, Corrosion inhibition), Reactor fuel processing, Containers, Antioxidants, Chromium compounds, Nitric acid, Fluorides, Boron compo, Patents.

The method of dissolving zirconium salts in a titanium container system is useful in the nuclear reactor field. The zirconium is reacted with zirconium dissolvent consisting of a 2 to 6 molar aqueous solution of nitric acid containing total fluoride not exceeding 3 molar and a titanium corrosion-inhibiting concentration of soluble boron salts and hexavalent chromium.

PB-169 160 **Field 18B**
CFSTI Prices: HC$3.00 MF$0.50
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
ETUDE DE CORPS RADIOACTIFS A VIE TRES BREVE PRODUITS PAR NEUTRONS RAPIDES (STUDY OF RADIO- ACTIVE NUCLIDES OF VERY SHORT HALF-LIFE PRODUCED BY FAST NEUTRONS),
by Edouard Monnand. Dec 65, 57p CEA-R-2900
Text in French; Attached Summary in English.

Descriptors: (*Radioactive isotopes, Half life), Fast neutrons, Boron, Sodium, Yttrium, Indium, Thallium, Lead, Bismuth, France.

Several radionuclides, already known, with half-lives ranging from 0.000051 to 1 second were observed by pulsed irradiations of C, Mg, Al, Y, In, Tl, Pb, Bi with 14.3 MeV neutrons. These radionuclides are: B12 (20+0.4 ms), Na24m (20±0.6 ms), Y88ml (0.332 ± 0.012 ms), Y88m2 (14.6 ± 0.4 ms), In114m (43.5 ± 2 ms), Tl202m (0.570 ± 0.010ms), Tl204m (0.063 ± 0.002 ms), Pb205m (5.5 ± 0.3 ms), Pb206m (0.126 ± 0.006 ms), Pb207m (830 ± 30 ms), and Bi208m (2.56 ± 0.1 ms). (Author)

PB-169 163 **Field 18G**
CFSTI Prices: HC$1.00 MF$0.50
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
DISPOSITIF DE RECUPERATION D'EFFLUENTS RADIOACTIFS (DEVICE FOR RECOVERING RADIO- ACTIVE WASTE),
by Roland Mas. Nov 65, 11p CEA-R-2894
Text in French; Attached Summary in English.

Descriptors: (*Radioactive waste, Processing), (*Container, Radioactive waste), Stainless steel, Concrete, France.

The previous system which consisted in the use of metallic reservoirs placed in a concrete-lined pit gave rise to certain incidents due to corrosion or overflowing followed by contamination with serious consequences. The new system presented consists essentially of a standard 3 cubic meters reservoir of stainless steel which is fixed in a concrete-lined well, is tubbed with stainless steel. Each reservoir has a standard lid on which are placed all the accessory devices, themselves standardized. The new reservoirs offer thus a great degree of security, and are interchangeable; the wells are easy to decontaminate and it is possible to work in a well without any danger of the personnel being irradiated by neighbouring reservoirs. (Author)

PB-169 170 **Field 18J, 13D**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
COMPORTEMENT D'UN CAISSON EN BETON RECONTRAINT SOUMIS A UN GRADIENT DE TEMPERATURE ELEVE (BEHAVIOUR OF A PRE-STRESSED CONCRETE PRESSURE-VESSEL SUBJECTED TO A HIGH TEMPERATURE GRADIENT),
by Frederic Dubois, Charles Bonvalet, Guy Dawance and Jean-Claude Marechal. Dec 65, 99p CEA-R-2829
Text in French; Attached Summary in English.

Descriptors: (*Pressure vessels, Nuclear reactors), (*Reinforced concrete, Pressure vessels), France, Model tests, Thermal stresses, High-temperature research, Cylindrical bodies, Deformation, Fracture (Mechanics), Creep.

Identifiers: Pre-stressed concrete.

A one-tenth scale model of a pre-stressed concrete cylindrical vessel without any side openings and without a base has been built. Before giving a description of the tests the authors consider some theoretical aspects concerning 'scale model-actual structure' similitude conditions and the calculation of the thermal and mechanical effects. The prestressed concrete model was heated internally by a 'pyrotenax' element and cooled externally by a very strong air current. The concrete was prestressed using horizontal and vertical cables held at 80 kg/sq cm; the thermal gradient was 160C. During the various tests, measurements were made of the overall and local deformations, the changes in water content, the elasticity modulus, the stress and creep of the cables and the depths of the cracks. The overall deformations observed are in line with thermal deformation theories and the creep of the cables attained 20 to 30 per cent according to their position relative to the internal surface. The dynamic elasticity modulus decreased by half but the concrete keeps its good mechanical properties. Finally, cracks 8 to 12 cms deep and 2 to 3 mms wide appeared in that part of the concrete which was not pre-stressed.

PNE-2000 **Field 18C, 13B**
CFSTI Prices: HC$1.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Livermore.
ISTHMAN CANCANAL STUDIES, 1964. ANNEX III. APPENDIX 1. NUCLEAR EVACUATION PLAN,
by Ernest Graves, Jr., Robert S. Holmes, andMilo D. Nordyke. Sep 64, 67p
Contract W-7405-eng-48

Descriptors: (*Nuclear explosions, Cratering), (*Inland waterways, Nuclear explosions).

PNE-2001 **Field 18C, 13B**
CFSTI Prices: HC$1.25 MF$0.75
Army Engineer Nuclear Cratering Group, Livermore, Calif.
ISTHMIAN CANAL STUDIES, 1964. ANNEX III.

APPENDIX 1. INCLOSURE A. EXCAVATION WITH NUCLEAR EXPLOSIONS.
Sep 64, 119p
Contract W-7405-eng-48

Descriptors: (*Nuclear explosions, Cratering), (*Inland waterways, Nuclear explosions).

PNE-2003 **Field 18C, 13B**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
ISTHMIAN CANAL STUDIES, 1964. ANNEX III. APPENDIX 1. INCLOSURE C. SAFETY EVALUATION FOR AIR BLAST, GROUND SHOCK, THROWOUT, AND DUST.
by Lewis J. Cauthen, Jr., John A. Korver, Milo D. Nordyke and Luke J. Vortman. Sep 64, 34p
Contract W-7405-eng-48

Descriptors: (*Nuclear explosions, Cratering), (*Inland waterways, Nuclear explosions).

PNE-2004 **Field 18C, 13B**
CFSTI Prices: HC$1.00 MF$0.50
Nevada Operations Office (AEC), Las Vegas.
ISTHMIAN CANAL STUDIES, 1964. ANNEX III. APPENDIX I. INCLOSURE D. NUCLEAR OPERATIONS.
Sep 64, 65p
Contract W-7405-eng-48

Descriptors: (*Nuclear explosions, Cratering), (*Inland waterways, Nuclear explosions).

PNE-242F **Field 18C**
CFSTI Prices: HC$4.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Livermore.
THE SEDAN EVENT.
by M. D. Nordyke and M. M. Williamson. Apr 65, 114p
Contract W-7405-eng-48
Rept. on Proj. SEDAN, Nevada Test Site, 6 Jul 1962.

Descriptors: (*Cratering, Nuclear explosions), (*Nuclear explosions, Cratering).

PNE-605F **Field 18C, 8K**
CFSTI Prices: HC$2.00 MF$0.50
Coast and Geodetic Survey, Rockville, Md.
STRONG-MOTION SEISMIC MEASUREMENTS. PROJECT DUGOUT,
by L. M. Lowrie and W. V. Mickey. May 65, 43p
Contract AT (29-2)-746

Descriptors: (*Nuclear explosions, Seismic waves), (*Seismic waves, Measurement).

PNE-807F **Field 18C, 18H, 6R**
CFSTI Prices: HC$3.00 MF$0.50
Weather Bureau Research Station, Las Vegas, Nev.
WEATHER AND SURFACE RADIATION PREDICTION ACTIVITIES FOR PROJECT HANDCAR.
Final rept.
Jan 65, 53p

Descriptors: (*Nuclear explosions, Underground), (*Radioactive fallout, Mathematical prediction).

PPAD-2137-549 **Field 18D, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Princeton-Pennsylvania Accelerator, Princeton, N. J.
BUBBLE CHAMBER MEASUREMENTS ON-LINE TO A PDP-5 PDP-1 SYSTEM,
by M. Bazin, J. Benoit, H. Blumenfeld, U. Naunberg and R. Zacher. 19 May 65, 8p CONF-650510-5
Contract AT (30-1)-2137
Presented at Purdue Conference on Instrumentation for High Energy Physics, Lafayette, Ind., 12-14 May 1965.

Descriptors: (*Bubble chambers, Measurement), (*Programming (Computers), Bubble chambers).

PWAC-474 **Field 18N, 18K, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Pratt and Whitney Aircraft, Middletown, Conn. Connecticut Advanced Nuclear Engineering Lab.
DETERMINATION OF ABSOLUTE POWER IN SNAP-50 CRITICAL ASSEMBLIES BY 140 BA FISSION PRODUCT MEASUREMENTS,
by W. F. Welsh. 30 Jul 65, 75p

Descriptors: (*Nuclear power plants, Spacecraft), (*Fission products, Critical assemblies).

RFP-534 **Field 18G**
CFSTI Prices: HC$2.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Denver, Colo.
AQUEOUS WASTE EVAPORATION,
by F. E. Butler and J. N. Vance. 6 Aug 65, 23p
Contract AT (29-1)-1106

Descriptors: (*Radioactive waste, Evaporation), (*Evaporation, Radioactive waste).

RL-SEP-518 **Field 18B, 7E**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Richland, Wash. Hanford Atomic Products Operation.
SOLVENT EXTRACTION RECOVERY OF AMERICIUM WITH DIBUTYL BUTYL PHOSPHONATE,
by R. S. Kingsley. 21 Jun 65, 35p
Contract AT (45-1)-1350

Descriptors: (*Solvent extraction, Americium), (*Americium, Recovery).

RMI-2 **Field 18J, 13H**
CFSTI Prices: HC$3.00 MF$0.75
Reactive Metals, Inc., Ashtabula, Ohio. Extrusion Plant.
AN EVALUATION OF DYNAPAK (HERF), EXTRUDED URANIUM TUBES,
by Q. C. Carloni and L. Robins. 9 Apr 65, 78p
Contract AT (30-1)-1405

Descriptors: (*Reactor fuel elements, Extrusion), (*Extrusion, Uranium).

SC-R-65-903 **Field 18I**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
VERIFICATION OF CLEANLINESS--WHAT DOES IT MEAN,
by L. K. Jones. Apr 65, 12p CONF-735-3
Contract AT (29-1)-789
Presented at National Meeting of The American Association for Contamination Control, Los Angeles, May 8, 1964.

Descriptors: (*Clean rooms, Contamination).

SC-R-65-904 **Field 18C, 19D, 8K**
CFSTI Prices: HC$3.00 MF$0.75
Sandia Corp., Albuquerque, N. Mex.
FOUR PAPERS CONCERNING RECENT WORK ON GROUND MOTION MEASUREMENTS,
by W. R. Perret, J. W. Wistor, G. J. Hansen and D. G. Palmer. Jul 65, 73p
Contract AT (29-1)-789

Descriptors: (*Seismology, Nuclear explosions), (*Nuclear explosions, Earthquakes).

SC-RR-65-303 **Field 18C, 8I**
CFSTI Prices: HC$3.00 MF$0.75
Sandia Corp., Albuquerque, N. Mex.
A SMALL-SCALE INVESTIGATION OF EXCAVATION WITH PARALLEL ROWS OF EXPLOSIONS,
by L. J. Vortman. Sep 65, 77p
Contract AT (29-1)-789

Descriptors: (*Nuclear explosions, Cratering), (*Cratering, Simulation).

SC-RR-65-417 **Field 18N, 22B**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
AEROSPACE NUCLEAR SAFETY PROBABILITY ANALYSIS OF REACTOR POWER LEVEL AND DOSE RATE,
by D. G. Kitzinger. Oct 65, 12p
Contract AT (29-1)-789

Descriptors: (*Reactor safety systems, Spacecraft), (*Spacecraft, Power reactors).

SC-RR-65-464 **Field 18H, 06R**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
FALLOUT REPORT. BETA-GAMMA RADIOACTIVITY IN AIR AT SANDIA LABORATORY JANUARY-JUNE 1965,
by R. B. Womeinduff. Oct 65, 11p
Contract AT (30-1)-789

Descriptors: (*Radioactive fallout, Air).

SC-TM-65-19 **Field 18D**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
SEMIAUTOMATIC BUBBLE CAMERA FOR CONTRAVES CINETHEODOLITE,
by B. L. Larson. May 65, 9p
Contract AT (29-1)-789

Descriptors: (*Horizontal indicators, Automatic), (*Reactor system components, Horizontal indicators).

STL-372-10 **Field 18K**
CFSTI Prices: HC$3.00 MF$0.75
TRW Space Technology Labs., Redondo Beach, Calif.
KINETIC STUDIES OF HETEROGENEOUS WATER REACTORS.
Quarterly progress rept. for period ending 30 Sep 64,
by C. T. Molloy, L. G. Neal, L. B. Wentz, R. W. Wright and S. M. Zivi. 30 Oct 64, 58p
Contract AT (04-3)-372

Descriptors: (*Reactor kinetics, Heterogeneous reactors), (*Heterogeneous reactors, Reactor kinetics).

TID-19421 **Field 18I, 18J, 18K**
CFSTI Price: HC$7.75
Babcock and Wilcox Co., Lynchburg, Va. Critical Experiment Lab.
ADVANCED TEST REACTOR CRITICAL EXPERIMENTS.
Final rept.,
by A. L. MacKinney, G. W. Fiscus, R. H. Lewis, and J. W. Poston. Aug 63, 455p

Descriptors: (*Critical assemblies, Nuclear engineering), (*Nuclear engineering, Test reactors).

TID-19943 **Field 18I, 18J, 18K**
CFSTI Price: HC$6.00
Kansas State Univ., Manhattan. Dept. of Nuclear Engineering.
A GRAPHITE SUBCRITICAL REACTOR LABORATORY FOR NUCLEAR ENGINEERING.
Mar 65, 455p
Contract AT (11-1)-1125

Descriptors: (*Subcritical assemblies, Nuclear engineering), (*Nuclear engineering, Graphite moderated reactors).

TID-21021 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Knolls Atomic Power Lab., Schenectady, N. Y.
ONE-SIDES NORMAL TOLERANCE FACTORS-NEW TABLES AND EXTENDED USE OF TABLES,
by G. L. Burrows. 1952, 27p
Contract W-31-109-eng-52

Descriptors: (*Tolerances (Mechanics), Tables), (*Reactor system components, Tolerances (Mechanics)).

TID-21406 **Field 18L, 18I**
CFSTI Prices: HC$2.00 MF$0.50
Consumers Public Power District, Lincoln, Neb.
HALLAM NUCLEAR POWER FACILITY.
Monthly operating rept. no. 26,
Sep 64, 73p
Contract AT (11-1)-513

Descriptors: (*Power reactors, Reactor operation).

TID-21607 **Field 18L, 18I**
CFSTI Prices: HC$3.00 MF$0.75
Consumers Public Power District, Lincoln, Neb.
HALLAM NUCLEAR POWER FACILITY.
Monthly operating rept. no. 28,
Nov 64, 59p
Contract AT (11-1)-513

Descriptors: (*Power reactors, Reactor operation).

TID-21842 **Field 18N, 18L**
CFSTI Prices: HC$1.00 MF$0.50
Bureau of Mines, Morgantown, W. Va. Coal Research Center.
HIGH-TEMPERATURE ENERGY SYSTEMS.
Quarterly progress rept. 1 Nov 64-31 Jan 65.
31 Jan 65, 16p

Descriptors: (*Power reactors, Gas turbines), (*Gas turbines, Spacecraft).

TID-21882 **Field 18G**
CFSTI Prices: HC$2.00 MF$0.50
Atomic Energy Establishment, Trombay (India).
INVESTIGATION OF MATERIALS AND METHODS FOR FIXATION OF LOW AND MEDIUM LEVEL RADIOACTIVE WASTE IN STABLE SOLID MEDIA.
Progress rept. for 1 Aug 64-31 Jan 65,
by R. C. Rastogi, J. D. Sehgal, and K. T. Thomas.
29 Mar 65, 34p
Contract AT (30-1)-3431

Descriptors: (*Radioactive waste, Disposal).

TID-21941 **Field 18C, 6F**
CFSTI Prices: HC$3.00 MF$0.75
Brigham Young Univ., Provo, Utah.
MAMMALS OF THE NEVADA TEST SITE,
by Clive D. Jorgensen and C. Lynn Hayward. Mar 65, 86p
Contract AT (11-1)-1355
Pub. in Brigham Young Univ. Sci. Bull., Biol. Ser., v6 no.3 Mar 1965.

Descritors: (*Nuclear explosions, Mammals), (*Ecology, Nuclear explosion damage).

TID-21945 **Field 18D, 18H**
CFSTI Prices: HC$3.00 MF$0.75
Washington Univ., Seattle.
THE EFFECT OF VARIOUS TREATMENTS ON THE THERMOLUMINESCENCE OF LITHIUM FLUORIDE EXPOSED TO LOW DOSES OF GAMMA RADIATION.
Master's thesis,
by Charles Ross Watson. 1965, 74p
Contract AT (45-1)-540
Submitted to the University of Washington.

Descriptors: (*Radiation damage, Luminescence), (*Fluorides, Lithium compounds).

TID-22014 **Field 18N, 18I, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Columbia Univ., New York. Engineering Research Labs.
HEAT TRANSFER AND HYDRAULIC STUDIES FOR SNAP-4 FUEL ELEMENT GEOMETRIES.
Topical rept. no. 4,
by R. Biderman and B. Matzner. 16 Sep 64, 22p
Contract AT (30-3)-187

Descriptors: (*Nuclear power plants, Spacecraft), (*Reactor fuel elements, Heat transfer).

TID-3545 **Field 18B, 18D**
CFSTI Prices: HC$5.00 MF$1.00
Division of Technical Information Extension (AEC), Oak Ridge, Tenn.
HOT LABORATORIES. AN ANNOTATED BIBLIOGRAPHY,
by William E. Bost. Nov 65, 194p

Descriptors: (*Radioactive isotopes, Handling).

TID-3571 **Field 18H, 18I**
CFSTI Prices: HC$3.00 MF$0.50
Division of Technical Information Extension (AEC), Oak Ridge, Tenn.
PULSED REACTORS AND PULSED CRITICAL ASSEMBLIES. A LITERATURE SEARCH,
by Richard J. Smith. Nov 65, 51p

Descriptors: (*Bibliographies, Nuclear reactors), (*Nuclear reactors, Bibliographies).

Identifiers: Pulsed reactors.

TID-7022 **Field 18K, 7D**
CFSTI Prices: HC$3.25 MF$1.50
National Lead Co. of Ohio, Cincinnati.
ANALYTICAL CHEMISTRY MANUAL OF THE FEED MATERIALS PRODUCTION CENTER. SAMPLES FROM THE SAMPLING PLANT KILN ASH THROUGH VITROCANONSBURG CONCENTRATE,
Dec 64, 311p
Contract AT (30-1)-1156

Descriptors: (*Production reactors, Chemistry), (*Chemistry, Instruction manuals).

TID-7031 **Field 18-, 20H**
CFSTI Prices: HC$5.00 MF$1.25
New York Operations Office (AEC), N. Y.
A HANDBOOK OF ABBREVIATIONS AND NICKNAMES CONCERNING WITH ATOMIC ENERGY,
comp. by Charles B. Yulish. May 64, 204p

Descriptors: (*Nuclear energy, Handbooks).
Identifiers: Abbreviations.

UCRL-11218 **Field 18D, 14B**
CFSTI Prices: HC$4.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Berkeley.
DESIGN, CONSTRUCTION, AND OPERATION OF A DIFFERENTIAL MICROMANOMETER. PART II. THEORY AND OPERATIONAL CHARACTERISTICS,
by Peter R. Rosy. 8 Apr 65, 119p
Contract W-7405-eng-48

Descriptors: (*Manometers, Operation).

UCRL-14123 **Field 18C, 7E**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
PROCESS STREAM ANALYSIS SYSTEMS FOR THE SCRUBBER SOLUTIONS USED IN THE PROJECT DRIBBLE VENT GAS TREATMENT PLANT,
by Lester P. Rigdon and Jackson R. Harrar. 10 May 65, 31p
Contract W-7405-eng-48

Descriptors: (*Nuclear explosions, Underground), (*Gas analysis, Nuclear explosions).

UCRL-14253 **Field 18D**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
ALPHA AIR MONITOR WITH CONSTANT FLOW CONTROL,
by E. L. Beard and K. F. Petrock. 30 Jun 65, 12p
Contract W-7405-eng-48

Descriptors: (*Alpha counters, Air), (*Gas flow, Control).

UCRL-14275 **Field 18A, 20I**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
DIFFUSION AND LOSSES OF ELECTRONS IN THE ASTRON E-LAYER,
by Richard B. Nicholson and Warren Heckrotte. 21 Jul 65, 45p
Contract W-7405-eng-48

Descriptors: (*Plasma accelerators, Electrons), (*Electrons, Diffusion).

UCRL-16073 **Field 18D**
CFSTI Prices: HC$7.43 MF$2.00
Lawrence Radiation Lab., Univ. of California, Berkeley.
THE ELECTROMAGNETIC LEVITATION OF METALS, THE DESIGN, CONSTRUCTION, AND OPERATION OF A DIFFERENTIAL MICROMANOMETER; STUDIES OF ATOMIC HYDROGEN AT LOW PRESSURES.
Doctoral thesis,
by Peter Roland Rony. 26 Apr 65, 443p
Contract W-7405-eng-48

Descriptors: (*Hoists, Magnetic fields), (*Manometers, Design).

UCRL-16197 **Field 18D, 20L**
CFSTI Prices: HC$3.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.
ON THE FORMATION OF DONOR-LIKE COMPLEXES IN DIFFUSED SILICON DEVICES,
by R. Y. Deshpande. 16 Jun 65, 55p
Contract W-7405-eng-48

Descriptors: (*Semiconductor devices, Radiation measurement systems), (*Radiation measurement systems, Semiconductor devices).

UCRL-7845-T **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
REMOTELY-OPERATED TRANS-PLUTONIUM CHEMICAL PROCESS CELLS,
by M. S. Coops, C. L. Hanson, R. W. Hawk and V. E. Scribner. 29 Jul 64, 28p
Contract W-7405-eng-48

Descriptors: (*Reactor fuel processing, Remote control systems), (*Plutonium, Reactor fuel processing).

WAPD-MRP-113 **Field 18I, 18J, 18K**
CFSTI Prices: HC$2.50 MF$0.75
Bettis Atomic Power Lab., Pittsburgh, Pa.
PRESSURIZED WATER REACTOR PROJECT.
Technical progress rept., 24 Apr 65-23 Jul 65. 1965, 120p
Contract AT-11-1-GEN-14

Descriptors: (*Pressurized water reactors, Design).

WAPD-T-1652 **Field 18L**
CFSTI Prices: HC$3.00 MF$0.75
Pittsburgh Univ., Pa.
STABILITY ANALYSIS FOR A STEAM GENERATOR.
Master's thesis,
by Michael A. Pulick. 1965, 77p
Contract AT (11-1)-GEN-14
Submitted to University of Pittsburgh, 1965.

Descriptors: (*Steam power plants, Power reactors), (*Power reactors, Stability).

WAPD-T-1791 **Field 18K, 18J, 20D**
CFSTI Prices: HC$1.00 MF$0.50
Bettis Atomic Power Lab., Pittsburgh, Pa.
ANALYTICAL MODEL FOR BLOWDOWN EXPERIMENTS,
by S. G. Margolis and J. A. Redfield. Apr 65, 15p CONF-650602-31
Contract AT (11-1)-GEN-14
Prepared for presentation at American Nuclear Society Annual Meeting (11th), Gatlinburg, Tenn., Jun 1965.

Descriptors: (*Two-phase flow, Mathematical models), (*Power reactors, Fluid flow).

WCAP-2120 **Field 18I, 18L**
CFSTI Prices: HC$2.00 MF$0.75
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
1000 MWE SUPERCRITICAL PRESSURE NUCLEAR REACTOR PLANT STUDY.
Quarterly progress rept. no. 3, Jul 1-Sep 30, 62, ed. by H. B. Kellogg, and J. F. Frain. Nov 63, 98p
Contract AT (30-1)-2940

Descriptors: (*Reactor operation, Power reactors), (*Power reactors, Reactor operation).

WCAP-3269-36 **Field 18J**
CFSTI Prices: HC$3.00 MF$0.50
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
FABRICATION AND IRRADIATION OF THIN-WALLED TYPE 304 STAINLESS STEEL CLAD FUEL RODS IN THE SAXTON REACTOR,
by D. R. McClintock. Jan 65, 53p
Contract AT (30-1)-3269

Descriptors: (*Fuel rods, Stainless steel).

WCAP-3269-6 **Field 18I, 18J**
CFSTI Prices: HC$4.00 MF$0.75
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
LARGE CLOSED-CYCLE WATER REACTOR RESEARCH AND DEVELOPMENT PROGRAM.
Progress rept. for 1 Oct-31 Dec 64. 31 Dec 64, 127p
Contract AT (30-1)-3269

Descriptors: (*Reactor operation, Reactor materials).

WCAP-3721 **Field 18H, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
LARGE CLOSED-CYCLE WATER REACTOR RESEARCH AND DEVELOPMENT PROGRAM.
Progress rept. for 1 Oct-31 Dec 62. 31 Dec 62, 62p
Contract AT (30-1)-3269

Descriptors: (*Reactor operation, Reactor materials).

WCAP-5449 **Field 18K, 20M**
CFSTI Prices: HC$2.00 MF$0.50
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
FORCED CONVECTION HEAT TRANSFER TO WATER AT NEAR-CRITICAL TEMPERATURES AND SUPERCRITICAL PRESSURES,
by A. A. Bishop, R. O. Sandberg, and L. S. Tong. 1964, 29p CONF-650603-1
Contract AT (30-1)-2948
Presented at Joint Meetings of the American Institute of Chemical Engineers and the British Institution of Chemical Engineers, London, Jun 1965.

Descriptors: (*Heat transfer, Critical assemblies), (*Critical assemblies, Heat transfer).

19. ORDNANCE

AD-431 682 **Field 17I, 9E**
CFSTI Price: HC$7.00
Westinghouse Defense and Space Center, Baltimore, Md. Surface Div.
LIGHTWEIGHT TECHNIQUES STUDY PROGRAM FOR AN/UPS-1 CLASS RADARS.
Final rept.
Jan 64, 404p
Contract NObsr-89533,
Proj. SF-001-02-01,
Task 6769

Descriptors: (*Search radar, Construction), (*Radar equipment, Weight), Feasibility studies, Reduction, Systems engineering, Design, Materials, Portable, Performance (Engineering), Life expectancy, Reliability (Electronics), Radar antennas, Microminiaturization (Electronics), Maintenance, Costs.

The application of lightweight techniques and design considerations has resulted in the long life, lightweight radar which has worldwide environmental capabilities. This lightweight radar weighs 76 percent less than the AN/UPS-1 and has the same performance characteristics. The use of lightweight metals, fiber glass, and plastics contributes significantly to the weight reduction. A singular example is the fiber glass reflector structure which permits the design of a foldable, self contained antenna reflector. Consequently, the reflector transport configuration requires no separate case. A single column antenna tower could then be incorporated, and the 295-pound combination reflector transport case and antenna support tower of the AN/UPS-1 is eliminated. Also contributing to the weight reduction is the use of microcircuitry in the receiver and the solid-state circuitry in the receiver and indicator circuits. The coaxial magnetron developed reduces the magnetron weight by one third from 90 pounds to 60 pounds. The hybrid solid-state-magnetic devices modulator results in a modulator weight reduction from 450 pounds to 130 pounds. The assumption that the equipment will be carefully handled in the field reduces significantly the size and weight of the protective cases. (Author)

AD-466 168 **Field 19A, 15C, 8M**
CFSTI Prices: HC$3.00 MF$0.75
Army Engineer Research and Development Labs, Fort Belvoir, Va.
SEASONAL MOISTURE-TEMPERATURE DISTRIBUTIONS IN MINED PODZOLIC SOIL.
Research rept.,
by Dwight L. Gravitte and Charles N. Johnson, Jr. Jun 65, 82p Rept. no. 1809
Proj. DA-1D624101A46101

Descriptors: (*Soil mechanics, Mine warfare), (*Land mine warfare, Soil mechanics), Soils, Moisture, Temperature, Land mines, Correlation techniques, Mine clearance.

This investigation is part of a continuing study of soil moisture-temperature properties and phenomena significant to the detection of buried mines and explosives. The report concludes: (a) In a heavy clay podzolic soil in a mid-latitude humid zone: (1) The moisture distribution in the soil around a mine differs from that in undisturbed soil. In the soil above the mine, there is normally a moisture deficiency, except during conditions of saturation. (2) During late spring, summer, and early fall, and when the moisture content approaches saturation, the temperatures in the soil above the mine and in undisturbed soil at the same depth are generally about the same, day or night. When the moisture content of the soil above the mine is lower than in undisturbed soil at the same depth, the temperature of the soil above the mine rises more rapidly during daylight hours than in undisturbed soils at the same depth, reaching a higher peak temperature than undisturbed soil in the early afternoon. During night hours, the soil above the mine cools more rapidly and may drop to a lower temperature than will undisturbed soil at the same depth. (3) When the soil moisture content approaches saturation during late fall, winter, and early spring conditions, the temperatures are about the same or lower in the soil above the mine relative to undisturbed soil at the same depth. (b) Moisture-temperature relationships in other major soil groups cannot be deduced from these studies but will require extended investigations. (Author)

AD-467 721 **Field 19F**
CFSTI Prices: HC$2.00 MF$0.50
Air Proving Ground Center, Eglin AFB, Fla.
SOUND AND SOUND PRESSURE LEVEL MEASUREMENTS OF THE HARP-BARBADOS 16.5-IN. GUN WITH A 51-FT MUZZLE EXTENSION.
Final rept., 31 May-7 Jun 65,
by Richard E. Spalinger. Jul 65, 26p APGC-TR-65-50
Proj. 0291Z

Descriptors: (*Naval guns, Acoustic properties), Sound, West Indies, Gun barrel attachments, Pressure, Blast, Feasibility studies.

Identifiers: Harp.

The problem of intense sound and sound pressure levels that result from the firing of a 16-in. gun with a 51-ft muzzle extension at Eglin AFB, and the possibility of resulting damage from the blast wave required examination before the installation of such a device at Eglin AFB can be approved. Measurements of the sound and sound pressure levels were made at Barbados, British West Indies, the only known installation of this type. Data were acquired from a sound level measuring system and a sound pressure measuring system on 13 firings. Based on data taken by the Canadian Government in December 1964 without the 51-ft muzzle extension, the effect of the 51-ft muzzle extension was to lower the peak sound and sound pressure levels as follows: (1) At a distance of 8000 ft, the average sound level was 120 db and the average sound pressure level .0029 psi; (2) At a distance of 6000 ft, the average sound level was 127 db and the average sound pressure level .0065 psi; (3) At a dis-

tance of 3000 ft, the average sound level was 129 db and the average sound pressure level .0072 psi; (4) At a distance of 750 ft, the average sound level was 147.3 db and the average sound pressure level .067 psi; and (5) The length of the sound pulse is between .5 sec and 1 sec in duration with a quick rise time and a slow decay time. (Author)

Patent 3,219,776 **Field 19A**
SWITCH ACTUATOR MECHANISM.
Patent assigned to AEC,
by Simon Yerkovich. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Actuators, Arming devices), (*Arming devices, Actuators), (*Bomb fuzes, Arming devices), Bombs, Detents, Patents.

The switch actuator mechanism has utility as a circuit arming device in bombs which are dropped from aircraft. The mechanism includes a plunger having a sleeve mounted thereon, spring detent mechanism cooperating with the sleeve whereby the sleeve is movable with a snap action, and the plunger having elements to engage the sleeve so as to cause the sleeve to move over center and to move relatively to the plunger in so doing.

PB-169 063 **Field 19A, 19D**
CFSTI Prices: HC$1.00 MF$0.50
Picatinny Arsenal, Dover, N. J.
STUDY FUNDAMENTAL PROPERTIES OF HIGH EXPLOSIVES,
by Leo S. Wise. 3 Jan 45, 14p Technical rept. TR-1466

Descriptors: (*Explosive materials, Detonation), (Pentolite, Detonation), (*Detonations, Test methods), TNT, RDX, Tetryl, Ammonium picrate, Mixtures.

The rate of detonation of cast 50/50 Pentolite has been determined by the Optical Method, equipment for which was recently installed at the Arsenal. The results were found to agree with values obtained by the Bruceton Laboratory of the NDRC within the experimental limits of the method of determination. Equally good agreement was found between the determined value for RDX Composition B and that reported by the Bruceton Laboratory for 60/40 Cyclotol. Rate of detonation tests of cast binary and ternary mixtures of TNT, Cyclonite, Tetryl, and Ammonium Picrate have also been made. To a first approximation, the rate of detonation of binary mixtures may be calculated from a principle of additive rates of detonation, which is discussed.

UCRL-14186 **Field 19A**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
A LOW-DENSITY, LOW-PRESSURE SOLID EXPLOSIVE,
by Paul B. Archibald. 25 May 65, 8p
Contract W-7405-eng-48

Descriptors: (*Explosive materials, Solids).

20. PHYSICS

AD-445 823 **Field 20B, 22B, 4A**
CFSTI Price: HC$3.00
General Dynamic/Astronautics, San Diego, Calif. Space Science Lab.
MOLECULAR IMPACT STUDIES.
Annual rept., 15 Jul 63-14 Jul 64,
by D. McKeown, H. R. Poppa, and M. G. Fox. Jul 64, 61p GDA-DBE64-048
Contract Nonr-3157 (00),
Proj. NR-012-403
N64 33841
See also AD-413 784.

Descriptors: (*Molecular beams, Sputtering), (*Sputtering, Upper atmosphere), (*Upper atmosphere, Sputter -ing), (*Epitaxial growth, Gold), (*Spacecraft, Sputtering), Single crystals, Metal films, Quartz, Crystal oscillators, Helium group gases, Surface properties, Silver, Satellites (Artificial), Erosion, Plasma medium, Deposition.

The report covers the investigations of the sputtering of surfaces by atoms, ions, and molecules. Measurements were conducted in the laboratory using molecular beam techniques at energies ranging up to 1 keV, and in the upper atmosphere from instrumented satellites. A technique was developed for the epitaxial growth of thin film crystals on quartz to make an oscillator useful as a sputtering detector. Au crystals were successfully grown on the quartz oscillators with the (111) plane parallel to the surface. Yield measurements were made in the threshold region on the (111) plane of Au in Ar (+). The effect of surface finish on the yields of polycrystalline Au, Ag, and Cu targets are given. Sputtering yields are given for Au and Ag as measured from satellites at altitudes of about 200km. It is shown that if particle impacts are to be a problem to spacecraft, they will result not from erosion as was generally believed a few years ago, but from deposition.

AD-456 725 **Field 20L, 18H**
CFSTI Price: HC$1.00
Harry Diamond Labs., Washington, D. C.
GAMMA-RAY IRRADIATION OF GERMANIUM. EFFECTS OF CHEMICAL IMPURITIES,
by Herman Shulman and George Ausman, Jr. 20 Nov 64, 25p TR-1266
Proj. HDL-23000

Descriptors: (*Semiconductor devices, Radiation damage), (*Germanium, Radiation damage), Gamma rays, Radioactive isotopes, Cobalt, Doping, Antimony, Arsenic, Hall effect, Temperature, Heat treatment, Impurities.

N-type germanium was irradiated in a cobalt-60 gamma source at ambient temperature (about 25 C). The effects of donor impurities (arsenic and antimony) upon conduction-electron removal rate (-dn/d phi) and subsequent annealing behavior were investigated experimentally by means of Hall effect and resistivity measurements. With irradiation, carrier-removal rates were observed to decrease markedly in antimony-doped germanium and more slowly in arsenic-doped samples. The rate of introduction of the characteristic 0.21-ev level (below the conduction band) was observed to decrease as the concentration of conduction electrons is increased; it is higher in antimony-doped samples than in those doped with arsenic. A study of the effects of annealing at temperatures near 100 C indicated that recovery of conduction electrons, as measured at 77 K, proceeds much more rapidly in antimony-doped germanium than in arsenic-doped germanium. The fraction of damage remaining unannealed in the latter is, for equal time at equal temperature, proportional to the concentration of arsenic atoms. On the other hand, the 0.21-ev levels anneal out more rapidly in the arsenic-doped material than in material doped with antimony. Recovery of the Hall mobility during thermal anneal proceeds concomitantly with the removal of the 0.21-ev level, although certain anomalies have been noted. (Author)

AD-461 628 **Field 20N**
CFSTI Price: HC$2.00
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
POLARIZATION TRANSFORMATION IN TWISTED ANISOTROPIC MEDIA,
by R. E. Van Doeren. 10 Feb 65, 32p OSURF-1804-1
Contract NOw-64-0293-d
Rept. on Electronic Polarization Control.

Descriptors: (*Polarization, Anisotropy), Electromagnetic fields, Propagation, Numerical analysis, Errors, Dielectric properties, Partial differential equations, Taylor's series, Difference equations.

Polarization transformation of plane waves propagating in twisted anisotropic media is studied theoretically and numerically. It is shown that rotation of linear polarization is effected by such a medium when the anisotropy is of the order of 2:1 and twist rates commensurate with the relative value of the dielectric constants of the medium are used (less than 151 lambda sub O for low dielectric constants and up to 901 lambda sub O for dielectrics in the vicinity of 1000). (Author)

AD-465 892 **Field 20F**
CFSTI Prices: HC$1.00 MF$0.50
ARO, Inc., Arnold Air Force Station, Tenn.
LIGHT ENERGY REACHING THE GRATING OF A SPECTROMETER,
by W. E. Bair. Jul 65, 21p
Contract AF40 (600)-1000,
Projs. AF-8952, ARO-VL3310
AEDC TR-65-125

Descriptors: (*Diffraction gratings, Resolution), Spectrophotometers, Collimators, Intensity, Light, Energy, Integrals, Optics.

The effective field of view of a spectrometer, when used with an external collecting lens, is shown to be defined by the width and height of the image of the slit. (Author)

AD-465 933 **Field 20A, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Microwave Lab., Stanford Univ., Calif.
MEASUREMENT OF MICROWAVE ACOUSTIC ATTENUATION IN SAPPHIRE AND RUTILE USING NICKEL FILM TRANSDUCERS.
Revised ed.,
by R. A. Wilson, H. J. Shaw and D. K. Winslow. May 65, 25p Scientific-3, ML-1253
Contract AF19 (628)-342,
Proj. AF-4600,
Task 460003
AFCRL 65-2,
N65 29262
Revision of Nov 1964 edition.

Descriptors: (*Microwave frequency, Mechanical waves), (*Sapphires, Acoustic properties), (*Rutile, Acoustic properties), (*Acoustics, Attenuation), S-band, Magnetostriction, Magnetostricitive elements, Transducers, Ultrasonic radiation, Nickel, Metal films, Magnetic fields, Measurement, L-band, X-band.

Identifiers: Microwave acoustics.

Initial investigations on the room temperature acoustic attenuation in sapphire and rutile at S-band, which were reported earlier, showed the attenuation in both of these materials to be relatively low. These measurements have now been extended to other frequencies, and curves of attenuation are shown for rutile shear waves and sapphire longitudinal waves covering the frequency range from L-band to X-band, and for sapphire shear waves from L-band to S-band. The attenuation has a nearly linear variation with frequency at the lower frequencies and increases monotonically as frequency increases. This behavior may be attributable to Rayleigh scattering from sub-micron scattering centers within the crystals. Nickel film magnetostrictive transducers, coupled to dielectric resonators, were used to generate the acoustic waves in the samples under study, and the acoustic attenuation was determined from echo measurements. Conversion efficiencies and certain other observed properties of nickel film transducers over the above frequency ranges are also discussed. (Author)

AD-466 026 **Field 20N, 22B, 17E**
CFSTI Prices: HC$3.00 MF$0.75
Rome Air Development Center, Griffiss AFB, N. Y.
DATA ANALYSIS OF ECHO I, II AND THE MOON. VOLUME II. POWER SPECTRAL DENSITY ANALYSIS OF PASSIVE SATELLITE REFLECTED SIGNALS.
Technical rept.,
by S. L. Zolnay. May 65, 59p RADC-TR-65-67-Vol-2

Descriptors: (*Communication satellites (Passive), Electromagnetic wave reflections),

(*Electromagnetic wave reflections, Communication satellites (Passive)), Signal-to-noise ratio, Radio signals, Spectrum signatures, Satellites (Artificial), Surface properties, Moon.

Identifiers: Echo.

This report deals with the power spectral density of passive satellite (Echo I, Echo II, and Moon) reflected signals. The prime objective is to present the power spectral density curves of pulsed cw and cw-type signals reflected by Echo II during selected passes of its first 2000 revolutions. Comparisons are made between the spectra of various types of signals reflected by the same satellite; between the spectrum of the same signal reflected by the various satellites; and between the spectrum of the same signal reflected by the same satellite in various path geometries. The conclusions are based on the available data and show that the spectrum of a signal reflected by Echo I differs only negligibly from that of Echo II, while the moon data exhibit details ascribable to considerably more surface roughness than either artificial satellite. The spectrum from Echo II indicate that possible deterioration is resulting in increased surface roughness of the satellite and that the path geometry possibly influences the data. (Author)

AD-466 031 **Field 20F, 20N**
CFSTI Prices: HC$1.00 MF$0.50
Dayton Univ., Ohio. Research Inst.
ATMOSPHERIC PROPAGATION STUDIES AT OPTICAL, MILLIMETER, AND MICROWAVE FREQUENCIES. PART II. THE MECHANISM OF SCINTILLATION.
Rept. for 1 Jan 64-20 Jan 65,
by Paul B. Taylor. Mar 65, 20p
Contract AF33 (615)-1265
AFAL TR-65-79-Pt-2

Descriptors: (*Scintillation, Meteorological phenomena), (*Light transmission, Scintillation), (*Radio transmission, Scintillation), Atmosphere, Wave transmission, Atmospheric refraction, Millimeter waves, Microwaves, Optics.

The scintillation of received signals propagated through some ten miles of atmosphere on narrow beams (one at an optical frequency, the other at a microwave frequency) have been reported in Part I. The present report reviews several explanations which might account for the phenomena. It is found that the scintillation observed in the microwave signal is not out of line with the statistical theories of propagation through a randomly homogeneous atmosphere which have proposed by others. However, a precise description of the mechanism is still wanting. The scintillation observed in the optical signal is more violent than any previously reported, and shows characteristics at variance with the statistical theories of the atmosphere presented in the literature--namely, in the occurrence of short intense bursts of signal superimposed on a low-level randomly fluctuating background. Scintillation in analogous phenomena, especially that of radio and optical stars, shows indications of similar traits. The several explanations which have been proposed are mutually at variance, and none stands up well under criticism. Further experiment and study is required if a tenable explanation is to be established. (Author)

AD-466 289 **Field 20F**
CFSTI Prices: HC$7.00 MF$1.50
Michigan Univ., Ann Arbor. Inst. of Science and Technology.
INFRARED HORIZON SENSORS.
IRIA State-of-the-Art rept.,
by John Duncan, William Wolfe, George Oppel andJames Burn. Apr 65, 322p Rept. no. 2389-80-T
Contract Nonr-1224 (12)

Descriptors: (*Infrared equipment, Horizon scanners), (*Horizon scanners, Infrared equipment), Optics, Atmosphere, Earth (Planet), Infrared radiation, Infrared scanning, State-of-the-art reviews.

More than 25 different infrared horizon-sensing instruments are described in this report. Particular attention is paid to their optical and electronic characteristics. Atmospheric properties which pertain to horizon detection are reviewed, and error analyses are made for the horizon-sensing instruments described. (Author)

AD-466 306 **Field 20M, 20D**
CFSTI Prices: HC$2.00 MF$0.50
California Univ., Berkeley. Inst. of Engineering Research.
AN EXPERIMENTAL STUDY OF THE ROTATIONAL DISTRIBUTION FUNCTION OF NITROGEN IN A SHOCK WAVE.
Technical rept.,
by F. Robben and L. Talbot. May 65, 50p AS-65-6
Contract Nonr-222 (45), Grant AF-AFOSR-538-65

Descriptors: (*Vortices, Energy), (*Nitrogen, Temperature), Distribution, Shock waves, Thermodynamics, Electron beams, Fluorescence, Measurement.

The electron beam fluorescence technique was used to measure the rotational energy distribution through shock waves in nitrogen. At Mach 1.7 the deviation from thermodynamic equilibrium was found to be small and the rotational temperature profile followed the density profile. Comparison with theoretical calcullations yielded the rotational relaxation collision number Z sub R=5, in reasonable agreement with other determinations. At high Mach numbers the measured rotational distribution function within the shock wave could not be represented by a single temperature, but was found to be representable approximately by the merging of two rotational distribution functions corresponding to temperatures upstream and downstream of the shock wave. The profile of the average local 'temperature' defined by the ratio of the total measured rotational energy to the gas density, was found to precede the density profile through the shock wave by an amount which increased with Mach number. (Author)

AD-466 571 **Field 20K, 13M**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Reclamation, Denver, Colo. Structural and Architectural Branch.
GRIFFITH'S THEORY OF RUPTURE,
by E. D. Morgan and J. F. Class. Jun 65, 43p
Rept. no. SA-3

Descriptors: (*Rupture, Theory), (*Brittleness, Failure (Mechanics)), Rock (Geology), Tensile properties, Fracture (Mechanics), Structures, Mathematical analysis, Engineering geology.

Identifiers: Griffith's theory.

Griffith's theory of rupture correctly portrays the mechanism of failure for brittle materials. Brittle fracture is due to high tensile stresses generated at the tips of the microscopic cracks which exist in all brittle materials. This high tensile stress exists near the tip of an elliptical crack regardless of the sign of the external stresses. Considerably more experimental research must be performed before the Griffith theory of rupture can be applied safely to engineering problems connected with rock mechanics. McClintock and Walsh modified Griffith's theory to take into account frictional forces which are developed when the crack is compressed. The modified Griffith theory is identical with the Coulomb law in the region of compression. After reviewing both Griffith's theory and the modified theories, it is concluded that Mohr's criteria to predict failure conditions in rock are the most applicable at the present time. (Author)

AD-467 870 **Field 20C, 20A, 14B**
CFSTI Prices: HC$4.00 MF$0.75
Naval Ordnance Lab., White Oak, Md.
PHYSICS RESEARCH PROGRESS FOR 1964,
by T. F. Johnston. 29 Jun 65, 108p NOLTR-65-113

Descriptors: (*Naval research, Naval research laboratories), (*Acoustics, Naval research), (*Nuclear physics, Naval research), (*Electromagnetism, Naval research), Hydrophones, Correlators, Underwater sound, Echo ranging, Underwater explosions, Sea water, Sonar equipment, Nuclear power plants, Nuclear forces, Field theory, Polarization, Nuclear spectroscopy, Radiography, Magnetometers, Garnet, Paramagnetic resonance, Superconductivity, Instrumentation, Fermions, Magneto-optic effect.

A progress report of the highlights of the work of the Physics Research Department in the calendar year 1964. The report is in three parts which describe progress in the Acoustics Division, the Nuclear Physics Division and the Electromagnetics Division respectively.

AD-468 198 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Columbia Univ., New York. Dept. of Civil Engineering and Engineering Mechanics.
EFFECTS OF MICRO-STRUCTURE ON THE STRESS CONCENTRATION AT A SPHERICAL CAVITY,
by J. L. Bleustein. Feb 65, 44p Technical rept. TR-54
Contract Nonr-266 (09),
Proj. NR-064-388

Descriptors: (*Stresses, Spheres), (*Microstructure, Stresses), (*Spheres, Stresses), Boundary value problems, Elasticity, Deformation, Equations, Anisotropy, Shear stresses, Hydrostatic pressure, Mechanical waves, Propagation.

In this paper the boundary-value problem for the stress concentration at a spherical cavity in a field of isotropic tension is solved within the framework of Mindlin's theory of an elastic continuum with a deformable micro-structure. It is found that the stress concentration factor is moderately larger than the 3/2 of classical elasticity for a wide range of material properties and ratios of radius of cavity to a length parameter of the material - with a critical ratio, nearly independent of the remaining material properties, for which the stress concentration factor is a maximum. (Author)

ANL-7034 **Field 20H, 18K**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Idaho Falls, Idaho.
THE RATIO OF U238 CAPTURE AND U235 FISSION CROSS SECTIONS IN FAST REACTORS,
by William G. Davey. May 65, 31p
Contract W-31-109-eng-38

Descriptors: (*Reactor kinetics, Fast reactors), (*Fast reactors, Fission).

ANL-7061 **Field 20H, 12A**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
A GENERAL THEORY OF FIRST-PASSAGE DISTRIBUTIONS IN TRANSPORT AND MULTIPLICATIVE PROCESSES,
by J. E. Moyal. Jun 65, 24p
Contract W-31-109-eng-38

Descriptors: (*Neutron transport theory, Distribution theory), (*Distribution theory, Neutron transport theory).

BDX-613-53 **Field 20K**
CFSTI Prices: HC$3.00 MF$0.75
Bendix Corp., Kansas City, Mo.
ELONGATION AS A QUANTITATIVE MEASUREMENT,
by E. P. Patterson. Dec 63, 68p
Contract AT (29-1)-613
Presented to ASTM.

Descriptors: (*Ductility, Measurement), (*Metals, Ductility).

BNL-7645 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
MAGNETIC INELASTIC SCATTERING OF NEUTRONS DETERMINED FROM THE TOTAL CROSS SECTIONS OF MnO AND MnO.5ZnO.5Fe2O4 AS A FUNCTION OF TEMPERATURE,
by A. M. Kistner and T. I. Taylor. 1963, 27p
Contract AT (30-2)-GEN-16
Prepared in cooperation with Columbia Univ., N. Y.

Descriptors: (*Inelastic scattering, Neutron scattering), (*Neutron cross sections, Inelastic scattering).

BNL-8508 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
STUDIES OF ALPHA-PARTICLE EMITTING STATES OF C 12 OBSERVED IN THE REACTIONS B 10 (He 3, p)C 12 (ALPHA)Be 8 AND C 13 (He 3, ALPHA)C 12 (ALPHA)Be 8,
by D. E. Alburger and P. F. Donovan. 7 Oct 64, 11p CONF-641005-21
Contract AT (30-2)-GEN-16
Presented at the Correlation of Particles Emitted in Neclear Reactions, Gatlinburg, Tenn.

Descriptors: (*Alpha decay, Carbon).

BNL-8509 **Field 20H**
CFSTI Prices: HC$3.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
EXPERIMENTAL INVESTIGATIONS OF SEVERAL FEW-NUCLEON SYSTEMS,
by Paul F. Donovan. 13 Oct 64, 30p CONF-641005-1
Contract AT-30-2-GEN-16
Presented at Correlation of Particles Emmited in Nuclear Reactions, Gatlinburg, Tenn. Prepared in cooperation with Bell Telephone Labs., Inc., Murray Hill, N. J.

Descriptors: (*Elementary particles, Nuclear reactions).

BNL-910 **Field 20G**
CFSTI Prices: HC$2.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
THE FAST BEAM EXTRACTION SYSTEM OF THE ALTERNATING GRADIENT SYNCHROTRON,
by E. B. Forsyth and C. Lasky. 10 Mar 65, 27p
Contract AT (30-2)-GEN-16

Descriptors: (*Particle accelerator components, Synchrotrons), (*Alternating gradient focusing accelerators, Particle beams).

C13.44-93 **Field 20F**
CFSTI Price: MF$0.75
National Bureau of Standards, Washington, D. C.
SPOT DIAGRAMS FOR THE PREDICTION OF LENS PERFORMANCE FROM DESIGN DATA,
by Orestes W. Stavroudis and Lloyd E. Sutton. 7 Sep 65, 102p NBS Monograph-93
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.75.

Descriptors: (*Lenses, Effectiveness), Digital computers, Design, Analysis, Optical images, Graphics, Light.

The monograph presents an outline of the methods used to predict the performance of lenses from an analysis of their designs. The technique is based on the use of spot diagrams, which are analogs of star image tests, and makes extensive use of high-speed digital computers. A collection of twenty-one spot diagram analyses is included. (Author)

C13.44-94 **Field 20M**
CFSTI Price: MF$0.75
National Bureau of Standards, Washington, D. C.
THERMODYNAMIC AND RELATED PROPERTIES OF PARAHYDROGEN FROM THE TRIPLE POINT TO 100K AT PRESSURES TO 340 ATMOSPHERES,
by H. M. Roder, L. A. Weber and R. D. Goodwin. 10 Aug 65, 117p NBS Monograph-94
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.75. See also PB-161 631.

Descriptors: (*Hydrogen, Thermodynamics), Density, Enthalpy, Entropy, Equations of state, Joule-Thompson effect, Heat, Melting, Specific heat, Vapor pressure, Sound, Velocity.

Experimental programs on parahydrogen at this laboratory have provided pressure-density-temperature relations and heat capacities at temperatures from 15 to 100K and at pressures from 2 to 350 atm. The two types of data have been correlated to yield a consistent set of functions. The properties tabulated for selected isobars and isochores are temperature, volume or pressure, the isotherm derivative, the isochore derivative, internal energy, enthalpy, entropy, the specific heats at constant volume and at constant pressure, and the velocity of sound. Also presented are the derived Joule-Thomson inversion curve and some comparisons with normal hydrogen near 100K. (Author)

C13.46-228 **Field 20N, 12A**
CFSTI Price: MF$0.50
Central Radio Propagation Lab., National Bureau of Standards, Boulder, Colo.
A TABULATION OF AIRY FUNCTIONS.
Technical note,
by H. T. Dougherty and M. E. Johnson. 18 Sep 64, 24p
NBS TN-228
Availability: Hardcopy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.20.

Descriptors: (*Tables, Special functions (Mathematical)), (*Special functions (Mathematical), Tables), Integrals, Graphics, Propagation, Radio waves.

Identifiers: Airy functions.

A tabulation is provided for Wait's formulation of the Airy function and its first derivative. The argument covers the range of real values from -6.0 to + 6.0 in intervals of 0.1. As an aid for their application the tabulations are also graphed. (Author)

CALT-68-36 **Field 20H, 20J**
CFSTI Prices: HC$1.00 MF$0.50
California Inst. of Tech., Pasadena.
APPROXIMATE SYMMETRY AND THE ALGEBRA OF CURRENT COMPONENTS,
by Roger F. Dashen and Murray Gell-Mann. May 65, 13p
Contract AT (11-1)-68

Descriptors: (*Nuclear structure, Quantum mechanics), (*Groups (Mathematics), Algebra).

GA-5176 **Field 20H, 18K**
CFSTI Prices: HC$3.00 MF$0.75
General Atomic, John J. Hopkins Lab. for Pure and Applied Science. San Diego, Calif.
INTEGRAL NEUTRON THERMALIZATION.
Quarterly progress rept. for the period ending 31 Mar 64,
by J. R. Beyster, J. R. Brown, J. U. Koppel, and J. A. Young. 17 Apr 64, 75p
Contract AT (04-3)-167

Descriptors: (*Neutron transport theory, Thermal neutrons).

GAP-3863 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., San Jose, Calif. Vallecitos Atomic Lab.
CONVERSION RATIO MEASUREMENT IN URANIUM- FUELED, LIGHT-WATER-MODERATED, SUPERHEATER LATTICES,
by H. M. Antunez. 1 Mar 62, 31p
Contract AT (04-3)-189

Descriptors: (*Conversion ratio, Measurement), (*Light water reactors, Conversion ratio).

IDO-16986 **Field 20H, 18I, 18K**
CFSTI Prices: HC$5.00 MF$1.00
Phillips Petroleum Co. Idaho Falls, Idaho. Atomic Energy Div.
RESONANCE ABSORPTION OF NEUTRONS IN MIXTURES OF THORIUM-232 TH AND URANIUM-238: AN INVESTIGATION OF INTERFERENCE BETWEEN ABSORBERS BY MEANS OF REACTIVITY MEASUREMENT FACILITIES.
Doctoral thesis,
by Wesley K. Foell. Aug 65, 152p
Contract AT (10-1)-205

Descriptors: (*Resonance absorption, Neutron transport theory), (*Reactor reactivity, Reactor fuels).

KAPL-M-6471 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Knolls Atomic Power Lab., Schenectady, N. Y.
THE SLOWING DOWN SOURCE INTO THERMAL FLUX CALCULATIONS IS NOT QUITE THE SLOWING DOWN DENSITY,
by F. D. Federighi and D. T. Goldman. 16 Apr 65, 13p
Contract W-31-109-eng-52

Descriptors: (*Neutron flux, Thermal neutrons).

LAMS-3015 **Field 20M, 7D**
CFSTI Prices: HC$6.00 MF$1.25
Los Alamos Scientific Lab., Univ. of California, N. Mex.
RADIATIVE AND CONDUCTIVE OPACITIES AND MONOCHROMATIC ABSORPTION COEFFICIENTS FOR COPPER,
by John N. Stewart and Arthur N. Cox. Mar 63, 204p
Contract W-7405-eng-36

Descriptors: (*Thermal properties, Copper), (*Atomic properties, Thermal properties).

MND-P-3005 **Field 20N**
CFSTI Prices: HC$3.00 MF$0.75
Martin Co., Baltimore, Md. Nuclear Div.
RADIOISOTOPE-FUELED AUXILIARY POWER UNIT.
Quarterly progress rept. no. 8, Oct-Dec 58. Dec 58, 72p
Contract AT (30-3)-217

Descriptors: (*Nuclear power plants, Spacecraft), (*Spacecraft, Auxiliary power plants).

MURA-700 **Field 20G**
CFSTI Prices: HC$1.75 MF$0.75
Midwestern Universities Research Association, Stoughton, Wis.
STUDY OF A 500 MEV HIGH INTENSITY INJECTOR,
by S. C. Snowdon. 8 Sep 64, 59p
Contract AT (11-1)-384

Descriptors: (*Proton accelerators, Injectors).

MURA-706 **Field 20G**
CFSTI Prices: HC$2.00 MF$0.50
Midwestern Universities Research Assn., Stoughton, Wis.
ALGORISMS FOR RELAATION CALCULATION OF FFAG MAGNETOSTATIC FIELDS,
by S. C. Snowdon. 10 Feb 65, 27p N65-19796
Contract W-31-109-eng-38-1707

Descriptors: (*Alternating gradient focusing accelerators, Magnetic fields).

MURA-709 **Field 20G, 20C**
CFSTI Prices: HC$2.00 MF$0.50
Midwestern Universities Research Assn., Stoughton, Wis.
A LOW FIELD SUPERCONDUCTING FFAG MODEL MAGNET,
by G. del Castillo. 26 Feb 65, 36p
Contract W-31-109-eng-38-1707

Descriptors: (*Alternating gradient focusing accelerators, Magnets), (*Magnets, Superconductors).

MURA-711 **Field 20G**
CFSTI Prices: HC$1.00 MF$0.50
Midwestern Universities Research Assn., Stoughton, Wis.
PRELIMINARY DESIGN DEVELOPMENT OF A VACUUM CHAMBER FOR THE ARGONNE ZGS,
by G. M. Lee, J. E. O'Meara and W. R. Winter. 1 Mar 65, 10p
Contract W-31-109-eng-38-1707

Descriptors: (*Synchrotrons, Vacuum apparatus), (*Vacuum apparatus, Design).

MURA-712 **Field 20G**
CFSTI Prices: HC$2.00 MF$0.50
Midwestern Universities Research Assn., Stoughton, Wis.
THE NUMERICAL DESIGN OF A RESONANT EXTRACTION SYSTEM FOR THE MURA 50-MEV ELECTRON ACCELERATOR,
by Philip F. Meads, Jr. 1 Mar 65, 28p
Contract W-31-109-eng-38-1707

Descriptors: (*Electron accelerators, Particle beams).

NAA-SR-MEMO-9624 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
GOLD. (GAUSSIAN OR LORENTZIAN DERIVATE CURVES),
by Katharine W. Medeiros and W. A. Young. Mar 64, 50p
Contract AT-11-1-GEN-8

Descriptors: (*Programming (Computers), Functions).

NBS-8797 **Field 20L, 20M**
CFSTI Prices: HC$1.00 MF$0.50
National Bureau of Standards, Boulder, Colo.
ON THE CRYOGENIC ASPECTS OF PROJECT SHERWOOD.
Progress rept. no. 21, 1 Jan 65 - 31 Mar 65. 31 Mar 65, 4p
Projs. 31503-12-3150437, 31503-12-3150438

Descriptors: (*Superconductivity, Field theory), (*Joule-Thompson effect, Cryogenics).

NEVIS-126 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
NEVIS Labs., Columbia Univ., Irvington-on-Hudson, N. Y.
DETERMINATION OF SIGMA-LAMBDA RELATIVE PARITY,
by Cynthia Alff Steinberger, N. Celfand, U. Nauenberg, M. Nussbaum, and J. Schultz. Oct 64, 43p R-457, CU-1932-232
Contract AT (30-1)-1932

Descriptors: (*Sigma hyperons, Parity), (*Parity, Hyperons).

NYO-1480-12 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
COLLISIONLESS SHOCKS AND SOLITARY WAVES,
by Cathleen S. Morawetz. 30 Nov 64, 12p MF-44, CONF-640804-2
Contract AT (30-1)-1480
Prepared for presentation to International Congress of Applied Mechanics, Munich.

Descriptors: (*Magnetohydrodynamics, Shock waves), (*Shock waves, Magnetohydrodynamics).

NYO-1930-43 **Field 20H**
CFSTI Prices: HC$4.00 MF$1.00
Clark Univ., Worcester, Mass. Dept. of Chemistry.
A STUDY OF SYMMETRIC FISSION OF LIGHT ELEMENTS.
Doctoral thesis,
by Hiroshi Baba. 1964, 143p
Contract AT (30-1)-1830
Submitted to Clark Univ., Worcester, Mass.

Descriptors: (*Fission, Radioactive isotopes).

NYO-2262-95 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Brown Univ., Providence, R. I. Dept. of Physics.
PROGRESS REPORT AND RENEWAL PROPOSAL FOR A RESEARCH PROGRAM IN EXPERIMENTAL AND THEORETICAL HIGH ENERGY PHYSICS,
by David Feldman and Anatole N. Shapiro. 1 Jun 65, 40p
Contract AT (30-1)-2262

Descriptors: (*Resonance scattering, Pions), (*Photonuclear reactions, Meson scattering).

NYO-2391-6 **Field 20B, 20M**
CFSTI Prices: HC$2.00 MF$0.50
Oxford Univ. (England). Dept. of Theoretical Physics.
THERMAL CONDUCTIVITY OF INSULATING CRYSTALS IN THE PRESENCE OF NORMAL PROCESSES,
by J. A. Krumhansl. Nov 64, 27p
Contract AT (30-1)-2179

Descriptors: (*Crystals, Thermal conductivity), (*Thermal conductivity, Phonons).

NYO-2813-30 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Stevens Inst. of Tech., Hoboken, N. J. Dept. of Physics.
PROPERTIES OF ALKALI-METAL MAGNETO-PLASMAS RELATED TO ENHANCED DIFFUSION,
by N. Wolf and K. C. Rogers. 1964, 9p CONF-640621-1
Contract AT (30-1)-2813
Presented at International Symposium on diffusion of plasma across a magnetic field, feldafing/starnberger see, ger.

Descriptors: (*Plasma medium, Alkali metals), (*Diffusion, Plasma medium).

NYO-3114-6 **Field 20D, 20M**
CFSTI Prices: HC$3.00 MF$0.75
Thayer School of Engineering, Dartmouth Coll., Hanover, N. H.
TWO-PHASE FLOW AND BOILING HEAT TRANSFER. THE SEPARATE-CYLINDERS MODEL OF TWO-PHASE FLOW.
Interim rept.,
by J. M. Turner and G. B. Wallis. May 65, 69p EURAEC-1415
Contract AT (30-1)-3114

Descriptors: (*Two-phase flow, Heat transfer), (*Heat transfer, Two-phase flow).

NYO-3114-7 **Field 20D, 20M**
CFSTI Prices: HC$1.00 MF$0.50
Thayer School of Engineering, Dartmouth Coll., Hanover, N. H.
TWO-PHASE FLOW AND BOILING HEAT TRANSFER.
Quarterly progress rept. for Jan-Mar 65,
by G. B. Wallis, J. M. Turner, P. E. Meyer and D. E. Runge. Apr 65, 21p EURAEC-1414
Contract AT (30-1)-3114

Descriptors: (*Two-phase flow, Heat transfer), (*Heat transfer, Boiling).

ORNL-P-1371 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Labs., Tenn.
S-WAVE NEUTRON STRENGTH FUNCTIONS OF ISOTOPES IN THE 3-s RESONANCE REGION $40 < A < 70$,
by R. Wagner, W. M. Good and D. Paya. 1964, 5p CONF-650706-5
Contract W-7405-eng-26
Presented at International Conference on the Study of Nuclear Structure with Neutrons, Antwerp.

Descriptors: (*Nuclear structure, Neutron scattering), (*Isotopes, Nuclear resonance).

ORNL-P-1386 **Field 20H, 12A**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
SPACETIME AND ELEMENTARY PARTICLE GROUPS,
by M. A. Melvin and R. Roskies. 1965, 14p CONF-650619-1
Contract W-7405-eng-26
Presented at Topical Conference on Resonant Particles (2nd), Athens, Ohio.

Descriptors: (*Elementary particles, Groups (Mathematics)), (*Groups (Mathematics), Relativity theory).

ORNL-P-1429 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
THE OAK RIDGE MULTIPLE-PASS INJECTION EXPERIMENT, DCX-2,
by P. R. Bell, R. A. Gibbons, G. G. Kelley, N. H. Lazar, and R. F. Stratton. 1964, 20p CONF-650911-1
Contract W-7405-eng-36
Prepared for Presentation at Conference on Plasma Physics and Controlled Nuclear Fusion Research (2nd), Abingdon, Berks, England.

Descriptors: (*Plasma medium, Injection).

ORNL-TM-1149 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
A LOW PASS FILTER FOR COLD NEUTRONS TO BE USED IN A SEARCH FOR A NEUTRON ELECTRIC DIPOLE MOMENT,
by P. D. Miller. Jun 65, 20p
Contract W-7405-eng-26

Descriptors: (*Neutrons, Dipole moments), (*Low -pass filters, Electric moments).

ORNL-TM-1187 **Field 20M**
CFSTI Prices: HC$6.00 MF$1.25
Oak Ridge National Lab., Tenn.
THE DEVELOPMENT OF A PULSE HEATING CALORIMETRIC TECHNIQUE FOR MEASURING THE SPECIFIC HEAT OF ELECTRICAL CONDUCTORS AND ITS APPLICATION TO PURE IRON FROM 100 TO 1400 DEGREES C.
Master's thesis,
by Thomas Gilman Kollie. Aug 65, 259p
Contract W-7405-eng-26
Submitted to Univ. of Tennessee.

Descriptors: (*Specific heat, Iron), (*Calorimetry, Iron).

ORNL-3300 **Field 20H, 18I**
CFSTI Prices: HC$3.50 MF$1.50
Oak Ridge National Lab., Tenn.
PUBLICATIONS, REPORTS, AND PAPERS FOR 1964 FROM OAK RIDGE NATIONAL LABORATORY,
ed. by K. O. Johnsson and Ann Klein Haas. Jun 65, 297p
Contract W-7405-eng-26

Descriptors: (*Nuclear physics, Bibliographies).

ORNL-3850 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
ELASTIC SCATTERING OF 12.0- and 14.0-MEV DEUTERONS FROM 90 ZR AND THE REACTION 90 ZR (D, P) 91 ZR TABULATED DIFFERENTIAL CROSS SECTIONS,
by J. K. Dickens, F. G. Perey, and R. J. Silva. Sep 65, 22p
Contract W-7405-eng-26

Descriptors: (*Elastic scattering, Deuterons), (*Deuterons, Differential cross section).

ORNL-3851 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
ELASTIC AND INELASTIC SCATTERING OF 12.0-MeV PROTONS FROM 62 Ni, 63 Cu, AND 64 Zn TABULATED DIFFERENTIAL CROSS SECTIONS,
by J. K. Dickens and S. J. Silva. Sep 65, 38p
Contract W-7405-eng-26

Descriptors: (*Proton scattering, Differential cross section), (*Differential cross section, Proton scattering).

ORNL-3871 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
THE ELECTRON-PHONON, ELECTRON-PLASMON, PLASMON-PHONON, AND PLASMON-PLASMON INTERACTIONS AND SOME INSTABILITIES THAT THEY LEAD TO,
by E. G. Harris. Nov 65, 19p
Contract W-7405-eng-26

Descriptors: (*Plasma oscillation, Stability).

Patent 3,219,534 **Field 20I**
PLASMA CONFINEMENT APPARATUS EMPLOYING A HELICAL MAGNETIC FIELD CONFIGURATION.
Patent assigned to AEC,
by Harold P. Furth. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Plasma medium, Confinement), Magnetic fields, Helixes, Solenoids, Patents.

The apparatus is for producing and magnetically confining a high temperature low pressure plasma under conditions suitable for the promotion of controlled fusion reactions. Stable equilibrium confinement of a plasma is provided in a closed toroidal-like magnetic field configuration whereby endlosses characteristic of open-end magnetic field configurations are averted.

PB-168 894 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Engineering Materials Research Lab., Brown Univ., Providence, R. I.
AN EXPERIMENTAL STUDY OF PLANE PLASTIC STRAINING OF NOTCHED BARS,
by W. N. Findley and D. C. Drucker. May 64, 38p EMRL-23
Grants NSF-GP-1115, NSF-GP-13815

Descriptors: (*Rods, Strain (Mechanics)), (*Strain (Mechanics), Rods), Steel, Aluminum alloys, Stresses, Loading (Mechanics), Thickness, Deformation.

Test results are presented for symmetrically notched one-inch wide steel and aluminum tension bars having a 0.30 inch wide net section between sharp 90 degrees notches. They show clearly that the limit load is close to the plane stress value for a ratio of specimen thickness to net width of 1/2 and is but halfway to the plane strain value for a ratio of 6. Strikingly different behavior is exhibited by the thin specimens of steel and aluminum. The apparent raising of the yield strength of aluminum but not of the steel is explained by reference to the difference between the Mises and the Tresca criteria of yielding. Special coupon tests in which plastic deformation is restricted to out-of-plane shearing demonstrate the validity of this concept. Both longitudinal extension and lateral contraction data help to give a physical picture of the changes in the pattern of deformation from thin to thick bars. The great importance of concentricity of loading is brought out and the techniques of testing are described in considerable detail. (Author)

PB-169 067 **Field 20D, 16B**
CFSTI Prices: HC$1.00 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
SEMI-EMPIRICAL FORMULAS FOR OGIVES,
by Edward R. C. Miles. 17 Sep 48, 17p APL/JHU-CM-505
Contract NOrd-7386
ATI 44377

Descriptors: (*Aerodynamic characteristics, Ogives), (*Ogives, Aerodynamic characteristics), Supersonic characteristics, Guided missiles, Drag, Shock waves, Conical bodies, Iterative methods.

The method of characteristics furnishes, at present, the only adequate means of calculating the surface pressure distribution, hence the aerodynamic characteristics, of a pointed body of revolution. The linearized theory of Karman and Moore is subject to severe limitations on the free stream Mach number and the nose angle. The Taylor-Maccoll iteration provides the conical field which is the starting point of the three-dimensional characteristics method. The numerical data calculated by an iteration process, pertaining to right circular cones at zero angle of attack, are tabulated in a recent publication. It is assumed that, for ogives, (delta p)/q = ax + b, where x is the axial distance from the nose of the missile. This assumption is in reasonably good agreement with results obtained by the characteristics method and by experiment. Formulas for the wave drag coefficient and the center of pressure are derived. (Author)

PB-169 071 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. High Voltage Research Lab.
BACK-SCATTERING OF MEGAVOLT ELECTRONS FROM THICK TARGETS,
by Kenneth A. Wright and John G. Trump. 1960, 17p
Grant NSF-G1201
Also supported by NIH.

Descriptors: (*Electrons, Backscattering), Particle accelerator targets, Mass number, Uranium, Lead, Gold, Copper, Iron, Aluminum, Magnesium, Beryllium, Tin, Cadmium, Bismuth, Zinc.

An experimental investigation was made of the backscattering of megavolt electrons from thick metal targets. Measurements were made of the currents in the back direction from twelve target metals bombarded by monoenergetic electrons in the range from 1 to 3 million volts. The ratio of back-directed electron current to primary beam current was found to vary from 0.53 for 1 Mev electrons incident on U to 0.03 for 3 Mev electrons incident on Be. Using targets of Al, Cu, and Pb bombarded with 1 to 3.5 Mev electrons, measurements were made of the total backscattered electron energy. This backscattered energy varied from a maximum of 34 per cent of the incident energy for Pb bombarded with 1 Mev electrons down to 1 per cent for Al bombarded with 3.5 Mev electrons. The average energy per particle of the backscattered electrons ranged from 79 per cent of the primary particle energy for 1 Mev electrons on a lead target to 44 per cent of the primary energy for 3 Mev electrons on aluminum. The dependence of electron scattering and of the backscattered electron energy on the atomic number of the target and on the incident electron energy is discussed. This relatively large backscattered energy is important in the performance of acceleration tubes, in radiation processing, and in other high energy electron applications. (Author)

PB-169 086 **Field 20J**
CFSTI Prices: HC$2.00 MF$0.50
Maryland Univ., College Park.
DETECTION AND GENERATION OF GRAVITATIONAL WAVES,
by J. Weber. 1960, 28p
Grant NSF-G4147

Descriptors: (*Gravity, Field theory), (*Relativity theory, Gravity), Tensor analysis, Strain (Mechanics), Crystals, Fourier analysis.

Identifiers: Gravitational radiation.

Methods are proposed for measurement of the Riemann tensor and detection of gravitational waves. These make use of the fact that relative motion of mass points, or strains in a crystal can be produced by the space derivatives of the gravitational fields. The strains in a crystal may result in electric polarization in consequence of the piezo electric effect. Measurement of voltages then enables certain components of the Riemann tensor to be determined. Mathematical analysis of the limitations is given. Arrangements are presented for search for gravitational radiation. The generation of gravitational waves in the laboratory is discussed. New methods are proposed which employ electrically induced stresses in crystals. These give approximately a seventeen order increase in radiation over a spinning rod of the same length as the crystal. At the same frequency the crystal gives radiation which is about thirty-nine orders greater than that of a spinning rod. (Author)

PB-169 145 **Field 20A, 17A, 9A**
CFSTI Prices: HC$1.00 MF$0.50
Navy Underwater Sound Reference Lab., Orlando, Fla.
THE USRL TYPE E8 TRANSDUCER, AN UNDERWATER SOUND CALIBRATION STANDARD FOR THE 100- TO 1000-KILOCYCLE FREQUENCY RANGE,
by R. J. Bobber. 16 Jun 52, 22p USRL-22
Proj. USRL-ID-596
AD 10093

Descriptors: (*Electroacoustic transducers, Underwater sound equipment), (*Underwater sound equipment, Electroacoustic transducers), Calibration, Standards, Low frequency, Medium frequency, Sound transmission, Resonators, Lithium, Sulfates, Piezoelectric crystals.

The development of an electroacoustic transducer which can be used as a hydrophone, a projector, or the bilateral transducer in a reciprocity calibration. In the 100- to 1000-kc frequency range is described. A lithium sulfate thickness-expander disc operating in an inertia drive is used. (Author)

PB-169 146 **Field 20M, 20D**
CFSTI Prices: HC$4.00 MF$0.75
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
FILM BOILING OF SATURATED LIQUID FLOWING UPWARD THROUGH A HEATED TUBE: HIGH VAPOR QUALITY RANGE,
by William F. Laverty and Warren M. Rohsenow.
Sep 64, 113p Rept. no. 9857-32
Grant NSF-GP-1245

Descriptors: (*Film boiling, Scientific research), Liquids, Two-phase flow, Pipes, Heating, Vapors, Vaporization, Heat transfer.

Film boiling of saturated liquid flowing upward through a uniformly heated tube has been studied for the case in which pure saturated liquid enters the tube and nearly saturated vapor is discharged. Since a previous study at the M.I.T. Heat Transfer Laboratory covered the case in which only a small percentage of the total mass flow is vaporized, this investigation has been concentrated on film boiling in the region where the vapor quality is greater than 10 percent. Visual studies of film boiling of liquid nitrogen flowing through an electrically conducting pyrex tube have been made to determine the characteristics of the two-phase flow regimes which occur as a result of the film boiling process. It was found that the annular flow regime with liquid in the core and vapor between the liquid and the tube wall, which exists at very low qualities, is broken up at higher qualities to form a dispersed flow of droplets and filaments of liquid carried along in a vapor matrix.

PPAD-524-E **Field 20C, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Princeton-Pennsylvania Accelerator, Princeton, N. J.
FORTRAN COMPUTER PROGRAMMES FOR MAGNETIC FIELDS FROM AXIALLY SYMMETRIC AIR CORE SOLENOIDS,
by G. R. Henry and G. Schrank. Aug 64, 21p
Contract AT (30-1)-2137

Descriptors: (*Solenoids, Magnetic fields), (*Programming (Computers), Magnetic fields).

SC-R-64-1361 **Field 20N**
CFSTI Price: HC$1.00
Sandia Corp., Albuquerque, N. Mex.
PROPAGATION OF AN ELECTROMAGNETIC WAVE IN A TIME-VARYING MEDIUM. PART I. GENERAL THEORY,
by Kaiser S. Kunz. Oct 64, 24p
Contract AT (29-1)-789

Descriptors: (*Electromagnetic waves, Propagation).

SLAC-PUB-44 **Field 20J**
CFSTI Prices: HC$1.00 MF$0.50
Stanford Linear Accelerator Center, Stanford Univ., Calif.
ON THE PROBLEM OF HIDDEN VARIABLES IN QUANTUM MECHANICS,
by J. S. Bell. Aug 64, 22p
Contract AT (04-3)-326

Descriptors: (*Quantum mechanics, Analysis of variance).

SLAC-47 **Field 20G**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Linear Accelerator Center, Stanford Univ., Calif.
PROPERTIES OF SYMMETRIC QUADRUPOLE MAGNET TRIPLETS,
by K. L. Brown and A. C. Hindmarsh. Aug 65, 49p
Contract AT (04-3)-400

Descriptors: (*Magnets, Particle accelerators), (*Particle accelerators, Magnets).

TID-21038 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Knolls Atomic Power Lab., Schenectady, N. Y.
MODIFIED SPHERICAL HARMONIC APPROXIMATIONS,
by T. E. Dudley and P. B. Daitch. 1957, 14p
Contract AT (30-3)-328

Descriptors: (*Neutron transport theory, Approximation (Mathematics), (*Harmonic analysis, Neutron transport theory).

TID-21629 **Field 20H**
CFSTI Prices: HC$5.00 MF$1.25
Aerojet-General Nucleonics, San Ramon, Calif.
ANGULAR DISTRIBUTION COEFFICIENTS FOR ELASTIC SCATTERING OF NEUTRONS,
by C. P. Altamirano and S. T. Perkins. Dec 64, 187p AN-1321
Contract AT (10-1)-880

Descriptors: (*Elastic scattering, Neutron scattering), (*Neutron scattering, Differential cross section).

TID-21923 **Field 20B, 20C**
CFSTI Prices: HC$1.00 MF$0.50
Cornell Univ., Ithaca, N. Y. Lab. of Atomic and Solid State Physics.
ELECTRONIC PROPERTIES OF DEFECTS IN IONIC CRYSTALS.
Progress rept.,
by Douglas B. Fitchen. May 65, 10p
Contract AT (30-1)-3464

Descriptors: (*Crystal lattice defects, Electrical properties).

TID-21940 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Virginia Univ., Charlottesville.
PHOTONEUTRON PRODUCTION CROSS SECTIONS FOR LIGHT NUCLEI.
Final rept.,
by W. D. Whitehead. 15 Jan 65, 47p

Descriptors: (*Photonuclear reactions, Neutron cross sections), (*Neutron cross sections, Photonuclear reactions).

TID-21942 **Field 20H, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Knolls Atomic Power Lab., Schenectady, N. Y.
OPTIMIZING NEUTRON ACTIVATION ANALYSIS,
by M. B. Leboeuf. 13 May 65, 22p
Contract W-31-109-eng-52

Descriptors: (*Neutron activation, Analysis), (*Optimization, Analysis).

TID-22038 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Maryland Univ., College Park. Dept. of Physics and Astronomy.
TIME REVERSAL INVARIANCE IN SIGMA 0 TO LAMBDA 0 + e(+) + e(-).
Technical rept.,
by R. G. Glasser, R. A. Burnstein, and T. B. Day.
Jul 65, 6p TR-476
Contract AT (40-1)-2504

Descriptors: (*Sigma hyperons, Nuclear reactions), (*Pair production, Hyperons).

UCRL-11802 **Field 20F**
CFSTI Prices: HC$4.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Berkeley.
ANALYSIS OF ELIPTICALLY POLARIZED LIGHT,
by Rolf H. Muller and J. Richard Mowat. Oct 65, 115p
Contract W-7405-eng-48

Descriptors: (*Light, Polarization).

UCRL-14244 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
DERIVATION OF A GENERALIZED VON NEUMANN PSUEDO-VISCOSITY WITH DIRECTIONAL PROPERTIES,
by Gerald T. Richards. 21 Jul 65, 21p
Contract W-7405-eng-48

Descriptors: (*Shock (Mechanics), Fluid flow), (*Viscosity, Numerical analysis).

UCRL-14345 **Field 20F, 20E**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
THE EFFECT OF HIGH VELOCITY TRANSLATION ON PHOTON CORRELATIONS IN LASER INTERFEROMETERS,
by Thomas J. Burgess. 17 Aug 65, 13p
Contract W-7405-eng-48

Descriptors: (*Interferometers, Photons), (*Lasers, Interferometers).

UCRL-14364 **Field 20J**
CFSTI Prices: HC$3.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Livermore.
THE KIRZHNITS CORRECTIONS TO THE THOMAS -FERMI EQUATION OF STATE,
by Shaun L. McCarthy. 26 Aug 65, 62p
Contract W-7405-eng-48

Descriptors: (*Equations of state, Corrections).

UCRL-16016 **Field 20G**
CFSTI Prices: HC$3.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Berkeley.
A GUIDE FOR DESIGNING ELECTRICAL CONTROLS OF ACCELERATORS,
by C. A. Harris. 24 Mar 65, 63p
Contract W-7405-eng-48

Descriptors: (*Particle accelerator components, Design).

UCRL-16026 **Field 20H**
CFSTI Prices: HC$3.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Berkeley.
Ke4 DECAY AND THE DETERMINATION OF PI-PI SCATTERING PHASE SHIFTS.
Doctoral thesis,
by Alexander T. Maksymowicz. 1 May 65, 93p
Contract W-7405-eng-48

Descriptors: (*K mesons, Meson scattering), (*Pions, Phase shift).

UCRL-16204 **Field 20G**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Berkeley.
BEVATRON OPERATION AND DEVELOP-

MENT. 45. JANUARY THROUGH MARCH 1965,
by Kenneth C. Crebbin. 23 Jun 65, 13p
Contract W-7405-eng-48

Descriptors: (*Beratrons, Operation).

UCRL-7202 Field 20K
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
HIGH TEMPERATURE PLASTIC DEFORMATION OF POLYCRYSTALLINE BERYLLIUM OXIDE,
by Willis L. Barmore and Richard R. Vandervoort. 25 Jun 64, 30p
Contract W-7405-eng-48

Descriptors: (*Beryllium compounds, Oxides), (*Deformation, Crystals).

WAPD-TM-469 Field 20K
CFSTI Prices: HC$1.00 MF$0.50
Bettis Atomic Power Lab., Pittsburgh, Pa.
INELASTIC BUCKLING OF LONG AXIALLY COM- PRESSED CURVED PLATES,
by D. S. Griffin. Jul 65, 16p
Contract AT (11-1)-GEN-14

Descriptors: (*Buckling (Mechanics), Curved plates).

21. PROPULSION AND FUELS

AD-297 221 Field 21H, 21I
CFSTI Price: HC$6.00
Aeronutronic Div., Ford Motor Co., Newport Beach, Calif.
CHEMICAL CORROSION OF ROCKET LINER MATERIALS AND PROPELLANT PERFORMANCE STUDIES. VOLUME 2. DETAILED THEORETICAL PERFORMANCE OF SOME LIQUID PROPELLANT SYSTEMS.
Quarterly technical summary rept. no. 2,
by R. C. Oliver, S. E. Stephanou, R. J. Getz, D. Piper and R. W. Sprague. 20 Jan 63, 273p Pub-C-1960
Contract NOw-61-0905-c, ARPA Order-22-62, Task E
See also AD-406 727.

Descriptors: (*Combustion chamber liners, Corrosion), (*Liquid rocket propellants, Performance (Engineering)), (*Refractory materials, Corrosion), Halogen compounds, Hydrides, Boron compounds, Halides, Nitrogen compounds.

The theoretical performance of certain binary liquid propellant systems under a wide variety of expansion conditions and mixture ratios has been computed and results are presented in graphical and tabular form. The graphs show vacuum specific impulse for area ratios of 8, 20, and 50, sea level optimum specific impulse, characteristic velocity, molecular weight and chamber temperature as a function of mixture ratio, for both frozen and equilibrium (shifting) expansion conditions, at chamber pressures of 300 and 1000 psi. The tabular data are in the form of computer output sheets, and give detailed performance and other data for all integral area ratios from 1 to 50; values are also given at two larger area ratios, the values depending on the system. Altitude effects are discussed, and techniques described for computing ideal performance for any of these mixtures at any altitude; results are given for sea level, 10,000 feet and 50,000 feet and vacuum as a function of area ratio for each mixture for zero divergence angle. (Author)

AD-451 076 Field 21B, 7C
CFSTI Price: HC$1.00
Midwest Research Inst., Kansas City, Mo.
MASS SPECTROMETER STUDY OF METAL-CONTAINING FLAMES.
Quarterly technical summary rept. no. 12, 1 Jul-30 Sep 64,
by Thomas A. Milne and Frank T. Greene. 12 Nov 64, 13p
Contracts Nonr-3599 (00), ARPA Order-23-63, Proj. MRI-2551-P
See also AD-444 105.

Descriptors: (*Flames, Mass spectroscopy), (*Free radicals, Mass spectrum), (*Mass spectroscopy, Flames), Hydroxides, Hydrogen, Oxygen, Methane, Metals, Chemical equilibrium, Molecular beams, Samplers.

Identifiers: Hydroxyl radicals.

The free radical OH was quantitatively sampled from H2-O2 and CH4-O2 one atmosphere flames at temperatures from 2300 - 3000K. Oxygen atoms and hydrogen atoms were sampled from H2-O2 flames. A summary is given of equilibrium constants for various high temperature equilibria studied so far in this program. Agreement is within a factor of two in Keq. in almost every case. (Author)

AD-466 276 Field 21I, 21B
CFSTI Prices: HC$1.00 MF$0.50
Princeton Univ., N. J. Dept. of Aerospace and Mechanical Sciences.
SOLID PROPELLANT COMBUSTION MECHANISM STUDIES.
Progress rept. no. 18, 1 Oct-31 Dec 64,
by Johan A. Steinz and Martin Summerfield. 29 Jun 65, 21p Aerospace/Mechanical Sci-446q
Contract Nonr-1858 (32), ARPA Order-23, Proj. NR-092-516
See also AD-299 989.

Descriptors: (*Solid rocket propellants, Combustion), (*Combustion, Solid rocket propellants), (*Composite propellants, Combustion), Burning rate, Low-pressure research, Sulfides, Polymers, Ammonium compounds, Perchlorates, Flames, Thermodynamics, Heat of activation, Quenching (Inhibition), Theory, Combustion products.

Identifiers: Ammonium perchlorate, Polysulfides.

The character of the combustion zone and the burning rates of several ammonium perchlorate composite propellants was studied in the subatmospheric, low pressure regime down to one tenth of an atmosphere. In general, at sufficiently low pressure, quenching takes place. However, it has been observed that AP polysulfide propellants do not quench but display instead a transition, as the pressure is lowered, from the 'normal' mode of combustion exhibiting a visible flame to one where no flame is visible and a porous ash remains as a combustion product. It is suggested that the continuation of burning at low pressures is due to the inhibition of the loss of heat to the surroundings by the retained ash. An analysis based on this hypothesis shows that, even without the insulating effect of the ash, steady burning is possible all the way down to zero pressure, provided the gasification process at the solid surface is exothermic, and provided the activation energy for this process is small. Conversely, for endothermic processes or for large activation energies, quenching will occur when there is no insulating ash. Thus, the study of low pressure burning opens up the possibility of measuring the heat of gasification at the surface and the activation energy for the gasification process. (Author)

AD-466 278 Field 21I, 21B
CFSTI Prices: HC$2.00 MF$0.50
Princeton Univ., N. J. Dept. of Aerospace and Mechanical Sciences.
SOLID PROPELLANT COMBUSTION MECHANISM STUDIES.
Progress rept. no. 19, 1 Jan-31 Mar 65,
by Thomas J. Ohlemiller, Joseph Wenograd and Martin Summerfield. Jun 65, 26p Aerospace/Mechanical Sci-446r
Contract Nonr-1858 (32), ARPA Order-23, Proj. NR-092-516
See also AD-466 276.

Descriptors: (*Solid rocket propellants, Combustion), (*Combustion, Solid rocket propellants), (*Composite propellants, Combustion), Combustion products, Low-pressure research, Gases, Burning rate, Test methods, Arc heaters, Ammonium compounds, Perchlorates, Particle size, Thermodynamics.

Identifiers: Ammonium perchlorate.

The research was designed to study the nature of the processes involved in ammonium perchlorate-based composite propellant gasification in the absence of the complicating effects of the gas phase flame. The experimental method permits the measurement of propellant regression rates in the absence of the gas phase flame. An intense radiant flux from an arc-image furnace is substituted for the conductive heat flux generally associated with the flame. The flame itself is eliminated by working at a vacuum below the propellant combustion limit. Two main questions as to the validity of this method are posed. Can variations in solid absorptivity and reflectivity with particle size cause specious effects of particle size on burning rate. Can the rapid variation of flux within the focal region of an arc-image furnace destroy the significance of the burning rates obtained with such a device. The conclusion is reached that both of these problems can be overcome and the method is valid. Preliminary tests on PBAA propellants subject to a radiant flux of 10 cal/sq cm sec gave burning rates of the order of 1/2 mm/sec with no evidence of a gas phase flame being present. (Author)

AD-466 801 Field 21B, 7D
CFSTI Prices: HC$2.00 MF$0.50
Midwest Research Inst., Kansas City, Mo.
MASS SPECTROMETRIC STUDIES OF REACTIONS IN FLAMES-QUANTITATIVE SAMPLING OF FREE RADICALS FROM ONE-ATMOSPHERE FLAMES.
Technical rept.,
by Thomas A. Milne and Frank T. Greene. 16 Jul 65, 26p
Contract Nonr-3599 (00), ARPA Order-2 3-63 amend 38,
Projs. NR-092-513, MRI-2551-P

Descriptors: (*Flames, Mass spectrum), (*Free radicals, Flames), (*Mass spectroscopy, Flames), (*Molecular beams, Flames), Chemical reactions, Hydrogen, Oxygen, Hydroxides, Chlorine, Concentration (Chemistry), Chemical equilibrium, Dissociation.

Identifiers: Hydroxyl radicals.

Direct mass spectrometric sampling studies of oneatmosphere flames are described. A simple model of the sampling process is summarized which accounts for the effects and results obtained. Stable product analysis and evidence for appreciable temperature dependence of fragmentation patterns are shown. Quantitative sampling of the free-radicals H, O, OH and Cl from the burnt gas region of one-atmosphere flames is demonstrated, with direct observation of excess free radical concentrations in the reaction zones of these flames. (Author)

AD-469 227 Field 21H, 12B
CFSTI Prices: HC$2.00 MF$0.50
Rohm and Haas Co., Huntsville, Ala. Redstone Arsenal Research Div.
THE MULTIDATA METHOD OF APPROXIMATE LAPLACE TRANSFORM INVERSION,
by Thomas L. Cost and Eric B. Becker. 7 Sep 65, 49p Special rept. S-51
Contract DA-01-021-AMC-11536 (Z)

Descriptors: (*Integral transforms, Viscoelasticity), (*Viscoelasticity, Integral transforms), (*Rocket motors (Solid propellant), Stresses), Programming (Computers), Numerical analysis, Reliability, Boundary value problems, Special functions (Mathematical), Errors.

A newly developed approximate Laplace transform inversion method is described. A derivation of the method, termed the multidata method, is presented along with a derivation of Schapery's collocation method. Similarities and differences

between the two methods are described and discussed. Results of parameter studies of both methods are presented which demonstrate the sensitivity to error displayed by the collocation method and the improved accuracy obtainable with the multidata method as compared with the collocation method when errors exist in the function to be inverted. Computer program listings and operating instructions for both methods are presented. (Author)

CONF-640508 **Field 21F, 18N, 18I, 18D**
CFSTI Prices: HC$4.00 MF$1.75
Space Nuclear Propulsion Office (AEC/NASA), Washington, D. C.
REMOTELY OPERATED SPECIAL EQUIPMENT. VOLUME I, PARTS I AND II.
Proceedings of the 1964 Seminars May 26 and 27, 1964, AEC Headquarters, Germantown, Maryland.
1964, 382p

Descriptors: (*Spacecraft nuclear propulsion, Remote control systems).

CONF-641120 **Field 21F, 18N, 18I, 18D**
CFSTI Prices: HC$1.25 MF$0.75
Space Nuclear Propulsion Office (AEC/NASA), Washington, D. C.
REMOTELY OPERATED SPECIAL EQUIPMENT. VOLUME II.
Proceedings of the 1964 Seminars held at Nuclear Rocket Development Station, Jackass Flats, Nevada, November 4 and 5, 1964.
1964, 109p

Descriptors: (*Spacecraft nuclear propulsion, Remote control systems).

Patent 3,221,498 **Field 21H, 16D**
SECONDARY FLUID INJECTION THRUST VECTORING METHODS AND APPARATUS.
Patent assigned to Navy,
by Lester T. Bankston. 7 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Thrust vector control systems, Secondary injection), (*Secondary injection, Thrust vector control systems), Nozzles, Guided missiles, Exhaust gases, Liquids, Patents.

The method and apparatus is for controlling the direction of thrust produced by a nozzle to control the direction of movement of a missile which is propelled by a jet motor. The method involves the controlled injection of a liquid into an exhaust gas stream, the liquid remaining in a liquid state in the exhaust stream.

PB-169 186 **Field 21H, 11I, 11D**
Rocketdyne, Canoga Park, Calif.
DEVELOPMENT OF PLASTIC CASE FOR XM15 JATO ROCKET MOTOR.
Final technical engineering rept., 5 Dec 55-8 Jul 59,
by J. W. Hurst. Apr 60, 168p Rept. no. 728
Contract AF33 (600)-31436,
Proj. AMC-7-436b
AMC TR-59-7-436b,
AD 237 682
Availability: Reference only at CFSTI after original stock is exhausted.

Descriptors: (*Filament wound construction, Rocket cases), (*Rocket cases, Plastics), (*Jatos, Rocket cases), Epoxy plastics, Glass textiles, Manufacturing methods, Design, Performance (Engineering), Storage, Tests, Costs, Composite materials.

Identifiers: M-15 Motors.

A XM15 JATO rocket motor case 50 percent lighter than a comparable steel case and competitive in cost has been fabricated from Epon 828 epoxy resin reinforced with helically wound glass fibers. Successful firings and storage tests confirmed the ability of the plastic case to meet all design requirements. Sixty JATO motors were made of filament wound glass fiber reinforced plastic case, asbestos phenolic plastic aft head and nozzle, Buna-N rubber liner, and with the only metal parts being the forward head mounting bolts, rupture discs, steel insert for mounting the igniter assembly, and the mounting brackets. These steel parts accounted for 8 percent of the total weight. The comparable steel case weighs 94 pounds and costs $37.00 per motor. The plastic motor case weighs 41 pounds (57 percent reduction) and should cost approximately $37.00 per unit for a production rate of 5000 units per month. (Author)

RFP-397 **Field 21B**
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
A LABORATORY IGNITION SYSTEM,
by M. A. Thompson. 8 Jun 64, 15p
Contract AT (29-1)-1106

Descriptors: (*Ignition systems, Thermal analysis), (*Controlled atmospheres, Ignition systems).

22. SPACE TECHNOLOGY

AD-412 664 **Field 22B, 5C**
CFSTI Price: HC$<2.00
RAND Corp., Santa Monica, Calif.
JOINT COST AND PRICE DISCRIMINATION: THE PROBLEM OF COMMUNICATING SATELLITES,
by Leland L. Johnson. May 63, 35p P-2753

Descriptors: (*Communication satellites (Active), Costs), (*Space communication systems, Costs).

The purpose of the paper is to examine the nature of the potential conflict arising with the interaction of economic and political factors involved in establishing and operating the international enterprise. After a brief description of the technology of satellites and institutional arrangements for developing and operating a commericial system, data are given from past studies of satellites for analysis of the structure of cost. With use of a theoretical peak-load pricing model, in light of the cost analysis, the problem of efficient pricing for satellites is discussed. The enterprise is believed to face serious dilemmas with respect to its pricing policies, given the various objectives set forth in the Communications Satellite Act.

Patent 3,220,004 **Field 22B**
PASSIVE COMMUNICATION SATELLITE.
Patent assigned to NASA,
by Warren Gillespie, Jr. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Communication satellites (Passive), Inflatable structures), Patents, Radio waves, Structural properties.

An inflatably erectable passive communication satellite is disclosed which is adapted to be folded into a compact package for storage in a launch vehicle nose cone or in the final stage of a multi-stage rocket, and having upon inflation erection at least one spherical section for presentation to a source of radio frequency signals transmitted from the Earth. The satellite is formed at least in part of inflatable elements constructed of material in sheet form adapted to reflect radio frequency waves and so constructed as to possess structural rigidity upon erection sufficient to retain an erected configuration in an interplanetary spatial vacuum without the presence of internal pressure.

SC-RR-65-187 **Field 22C**
CFSTI Prices: HC$3.00 MF$0.75
Sandia Corp., Albuquerque, N. Mex.
ANALYTICAL METHODS USED IN PREDICTING THE RE-ENTRY ABLATION OF SPHERICAL AND CYLINDRICAL BODIES,
by L. O. Cropp. Sep 65, 98p
Contract AT (29-1)-789

Descriptors: (*Atmosphere entry, Ablation).

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Kansas City, Mo., 64106, Room 2011, 911 Walnut Street. BAltimore 1-7000.
Los Angeles, Calif., 90015, Room 450, Western Pacific Building, 1031 S. Broadway. Phone: 688-2833.
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Milwaukee, Wis., 53203, Straus Bldg., 238 W. Wisconsin Avenue. Phone: BR 2-8600.
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